

# ASTOUNDING

The cover features a dramatic illustration. A man in a dark crown and ornate armor holds a large, glowing blue cloak that billows around him. He has a serious expression. Below him, a woman with blonde hair and a young child look up at him with expressions of awe and wonder. The background is dark and atmospheric.

MAR. 1939

20¢

SCIENCE-FICTION

A STREET & SMITH PUBLICATION

**CLOAK OF AESIR**

By **DON A. STUART**

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# ASTOUNDING

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# APOLOGIA

Twice I have spoken of "Fantastic Fiction" come true, trying to show that the perhaps farfetched predictions of our authors are not so implausible as they seem. Herewith, apology. The authors lack imagination; they are conservative to so great a degree that no science-fiction story published has even remotely suggested this invention which is now fact, nor has any story begun to describe the immense effects this invention must have on all Earth's civilization.

The shaping of the courses of the future rests in the hands of two classes of men today; the scientist and the statesman. This year just gone, 1938, has seen Hitler reshape the map of Europe. Ten years ago, no man could have predicted that. No man can tell where the strong men of politics will arise.

No man need know where the strong men of science will arise. That Pasteur was a Frenchman, Roentgen a German, and Bell an American had no influence; each contributed to the world at large. The trend of science can be predicted as the trend of politics cannot.

In the civilization of a century hence, the works of Hitler and of every other statesman of the world today will mean far less than the development of one idea. And that one idea could have been accurately and faithfully predicted, even to many of the details, ten years ago!

Certain theoretical considerations indicated that electrons might act either as particles or as a type of wave, in much the manner light was known to display the particle properties of the quantum or photon, and the wave properties seen in interference phenomena. Dr. Davisson of the Bell Telephone Laboratories investigated, and proved that electrons did act as waves, waves showing interference, refraction and other phenomena akin to light's behavior. That was the year 1928.

Light has a wave length nearly 1,000 times the diameter of an atom. It is hopeless to "see" or "feel" an atom with any instrumentality so crude; only objects of approximately equal or greater size can be seen by light.

X rays, with their immensely finer structure, could see atoms; they are reflected from atoms, bounce off of electrons even, and that reflection makes it possible to see atoms by X rays. But—X rays cannot be focused by any lens known. Therefore, X rays cannot be made to give a clear, visible image of an object "illuminated" by them. However, the pattern of scattered X rays made when the rays bounce from atoms and molecules can, by laborious mathematics, be made to indicate a sort of average picture, a spacing between atoms and the rough diameter of the atoms.

That was the finest picture of atomic structure men could get; from laborious mathematical treatment of those blurry patterns, physicists and chemists worked out the spacing of carbon atoms in benzene, the structure of the crystals in a bit of tungsten wire that was to be a lamp filament.

Yet it was known—more than ten years ago—that electrons, too, acted like waves, could serve as an illuminant of the same fineness of structure the X rays displayed.

Dr. Zworykin, working on television at the RCA laboratories, developed the apparatus that would focus electron beams to make an image. Therein, obviously—so obviously science-fictionists should have seen it clearly five years ago!—lay the combination that needed only further refining to do the impossible, to make individual atoms clearly visible!

Practical science differs from science-fiction largely in this; the heroes of science-fiction perform experiments with invariable success. That is necessary, for there is little drama in the unending failure that dogs the research worker year after year, in the

slow, slow progress toward workability. Yet a practical scientist made that progress before our imaginative, fantastic-fiction specialists!

The electron-microscope is fact. It magnifies a million times. On a screen, scientists saw projected the true image of nine individual tungsten atoms of a tungsten crystal, proving visually what laborious X ray and mathematical work had let them know through hard years of work: that tungsten forms body-centered cubic crystals with eight atoms each at one corner of a cube, with a ninth in the center. Great chemists and physicists had theorized and worked and thought to develop the kinetic theory of gases over generations of scientific life. The electron microscope showed them—visually—molecules of gas bombarding the walls of a container.

Yes, science-fictionists have "predicted" super-ultra microscopes that could see atoms—but they didn't predict them on the basis of facts which have been known ten years. And they didn't predict the things that this must mean.

Metallurgists looking at the crystals of their alloys to see with their own eyes why an insignificant 2% of beryllium multiplies the strength of copper ten times—and learning to multiply the strength of magnesium, aluminum, steel perhaps, a thousand times!

Chemists who laboriously analyzed and tested to purify and find the structure of some immensely potent gland extract (it took three tons of fresh thyroid glands to permit the extraction of the first thyroxine!) to make it understood, and so make possible synthesis. Perhaps they'll put a minute crystal under this new and mighty tool—and have a secretary enumerate the atoms and their arrangement, while they develop methods of commercial synthesis. Analysis? Look at it and count the atoms!

And there's a strange and fascinating series that biochemists ponder over. An enzyme is a catalyst-molecule developed by a living cell for some specific purpose, such as digestion. Our stomach walls secrete one that can break apart the huge and complex molecules of animal protein to soluble, smaller molecules in some two hours. (Chemists use mixed nitric and sulphuric acids, and spend half a day at it, getting only elements, not usable, smaller molecules of amino-acids.) These enzymes are simply catalysts—but seem to have the power of reproducing themselves to some extent, twisting molecules of other substances into their own shape, which is typical of living things, not mere catalysts.

They do not do it successfully, entirely, for more enzyme molecules break down than new ones are built in that way. But there is this: enzymes are compounds that can be crystallized, pure chemicals. The living life-form of the virus has been crystallized—and freed to live again. Is it, perhaps, no more than a super-enzyme, more efficiently converting alien compounds to its own form?

And there is strong suspicion that the more common life-cell, such as we are built of, is largely inert housing for a viruslike nucleus, a chemical factory to support and protect the directing, controlling viruslike stuff, as our bodies protect and supply the directive brain—save that the protoplasm itself may not be life!

And here's the germ of madness for the biochemist: life is in essence made up of labile molecules, fleeting, constantly changing things. The first faint touch of analyzing reagent—and it ceases to be what the chemist is seeking! One of those things that, practically, is, by definition, unreachable. Like bouncing a fragile glass globe on a steel slab. By definition, if it does bounce, it isn't fragile.

But the electron microscope—

No science-fictionist ever proposed a tithe of the meaning this thing must have. To every science—medicine, chemistry, physics, metallurgy—this new microscope has potentialities so immense that we of today are totally unable to even guess at them.

Could Leeuwenhaeck imagine the immensity of his discovery?

The Editor.



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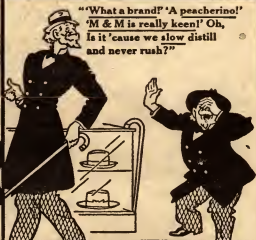


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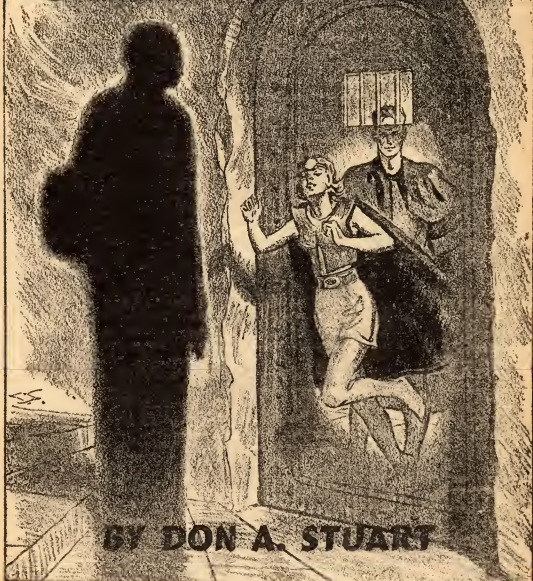
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# CLOAK OF BESIR



BY DON A. STUART

**T**HE Sarn-Mother's tiny, almost human face was lined with the fatigue of forty hours of continued strain. Now, she feared greatly, a new and greater tension was ahead. For the eight City-Mothers, taking their

places about the Conference Hall of the Sarn, were not going to be sympathetic to the Mother's story.

To them, the ancient Sarn-Mother well knew, the humans of Earth were slaves. Slaves bred for work, of little

mentality and no importance. Earth was the planet of the Sarn, the planet the Sarn had taken, some four thousand years before, from the race of small-bodied, small-minded weaklings called Man that had originally inhabited it.

And that idea was going to be extremely hard to change. Particularly, it would be hard for the Sarn-Mother to change that idea, for she was somewhat—not of them. The Sarn-Mother was the Immortal. She was, therefore, disliked.

These eight, these Mothers of Cities, were the matriarchic governors of Earth under the Sarn. Each had risen to overlordship of a continent, or near-continental area, by competitive brilliance among all their people. They had won their places, merited them, they felt.

But the Sarn-Mother? The ultimate ruler of all Earth, all Sarn and humans alike? She had not *inherited* her position exactly—she had simply been there forever. Her winning of it was forgotten in the mists of antiquity. The Sarn were a long-lived people—some lived a thousand years—but the Sarn-Mother was immortal; she had lived in the mythical days of the Forgotten Planet, before the home world of the Sarn had disrupted in cosmic catastrophe, forcing the race to seek new worlds.

The Sarn-Mother had won this world for them, but that—and all others who had fought mankind in that four-thousand-years-gone time—was forgotten. The Sarn-Mother was simply a hang-over from an era that should have died. So felt the Mothers of Cities, ambitious Sarn who saw a place above them that—because of the Mother's cursed immortality—they could never hope to reach.

The old Sarn-Mother knew that, and knew, too, that only her own possession of secret science those millenniums of her life had given her, made her place safe. The City-Mothers feared two things: that well-held secret science, and

the jealousy of their sisters.

The old Sarn was tired with mental struggle, and she knew, as soundly as she knew the City-Mothers hated her, that she was facing another struggle. The humans of Earth were rising in a slow, half-understood revolt. She and these eight City-Mothers knew that.

But the City-Mothers did not, and would not, admit that those humans were capable of revolt. For all their lives humans have been slaves, pets, a sort of domesticated animal. That they or the similarly domesticated cows might attempt to set up a civilization—

For the Sarn-Mother alone had been alive the four thousand years that had passed since Mankind's defense of Earth all but succeeded in defeating the invading Sarn. The City-Mothers could not understand. Subconsciously they had no intention of understanding anything so unpleasant.

THE SARN-MOTHER'S pointed, elfin face smiled weary greeting. Her fluting, many-toned speech betrayed her fatigue as she spoke to them. "I called you together, Daughters, because something of grave importance has arisen. You have heard, perhaps of the judging of Grayth and Bartell in the Hall of Judgment this morning?"

"Rumors," said the Mother of Tarplan, the city perched high in the crystal clarity of the mighty Himlya Mountains. "You reversed your judgment, I heard." Her voice was silky smooth—and bitter.

The Sarn-Mother's small, pointed face did not change. The trouble, definitely, was beginning. "I told you at the last Council that the human stock was rebuilding, that the submerged intelligence and will that built, before our invasion of this planet, a high civilization, were mounting again. It is, I believe, equal in power to that before the Conquest. And, under our rule, it has been purified in some respects. There is less violence, and more determination.



"It is somewhat hard for you to appreciate that, for you do not remember human beings as other than slaves.

"I recognize a certain growing restlessness at restraint. The majority of those humans do not yet know—understand—the reason for a vague restlessness that they feel. Their leaders do. They are restless of government and restraint, and I hoped to use that vagueness of feeling to destroy the tendency toward rebellion. I thought the rebellion might be turned against their own, proxy government. Therefore, I caused the humans to revolt against their government under us, instead of against the Sarn.

"Even I had underestimated them. Grayth and Bartell, the leaders of Mankind, appeared before me accompanied by Darnell, the rival leader. I will not detail their quarrel, save to say that Darnell was my tool. I sentenced Grayth and Bartell.

"Then—Aesir, he called himself—appeared. He was a blackness—a three-dimensional shadow. He stood some four feet taller than I, nearly twelve feet tall, twice the height of humans. But he was shaped like a human in bulk, though the vague blackness made any feature impossible. He claimed that he was not made of any form of matter, but was the crystallization of the wills of all humans who have died in any age, while seeking freedom,

"Aesir spoke by telepathy. Mind to mind. We know the humans had been near that before the Conquest, and that our own minds are not so adapted to that as are the humans'. Aesir used that method.

"He stood before me, and made these statements that were clear to the minds of all humans and Sarn in the Hall of Judgment. His hand of blackness reached out and touched Darnell, and the man fell to the floor and broke apart like a fragile vase. The corpse was frozen glass-hard in an instant of time.

"Therefore, I released Grayth and Bartell. But I turned on Aesir's blackness the forces of certain protective devices I have built. There is an atomic blast of one-sixteenth aperture. It is, at maximum, capable of disintegrating half a cubic mile of matter per minute. There was also a focused atomic flame of two-inch aperture, sufficient to fuse about twenty-two tons of steel per second.

"These were my first tests. At maximum aperture the blackness absorbed both without sound or static discharge, or any lightening of that three-dimensional shadow."

The Sarn-Mother's mouth moved in a faint, ironic smile. "There are," she went on softly, "certain other weapons there. The Death of the Mother, which I employed once on a rebellious City-Mother, some thirteen hundred years gone. Tathan Shoal, she was, of Bish-Waln." The Sarn-Mother's slitted eyes lit amusedly on the present Mother of Bish-Waln, capital city of the continent of Africa.

"Tathan Shoal had the mistaken idea that she might gain by attacking me. She came with many devices, including a screen capable of turning all the weapons she knew. It cost me the South Wall of the Hall of Judgment and an effective and efficient administrator to convince her. For she had been effective and efficient.

"Daughter of Targlan, it is best for the Race that we share knowledge. Tell your Sister of Bish-Waln the remarkable progress your physicist has made with the field she knows as R-439-K."

THE Mother of Targlan's face remained unchanged, save for a faint golden flush that spread over it, and the sudden angry fire of her eyes. Field R-439-K—her most treasured secret—

"It is a field," she said in a pleasant, friendly tone, "which causes the collapse of atoms within it, bringing about a

spreading disruption that continues so long as the generator is activated. It is necessarily spherical in shape, destroying the generator very quickly, however. It would be excellent as a sort of bomb." She added that last as a sort of after-thought, a hazy, bitter dream in her voice.

The Sarn-Mother smiled and nodded toward the Mother of Bish-Waln. That City Ruler's eyes were angry as had been her predecessor's as she responded to the unspoken command. But her voice betrayed no emotion.

"No, Sister, it can be projected to some extent. The generator need not be destroyed, though the projector is, if you employ a field of ellipsoidal form."

The Mother of Uhrnol smiled, but her smile was only half amusement. "The projector can be saved, too. It is too bad I could not have known of your efforts. I could have saved you considerable work."

The three smiled at each other in seeming friendliness. Each felt slightly relieved; she stood alone neither in her chastisement nor in the loss of treasured secrets.

"The point of interest," the Sarn-Mother pointed out softly, "is that none of you can stop that field. There is no protection. Some twenty-two centuries ago I discovered that interesting modification of the atomic-blast field, and within a century I had projected it. Ten centuries ago I had it tamed to the extent of a cylindrical tube of force of controllable dimensions. If Tathan Shoal had waited another five centuries before attacking me, she would not have cost me the South Wall. It still does not match perfectly the other three. But I cannot screen that force."

"Nor I," admitted the three City-Mothers, in turn. There was a hint of bitter defeat in their tones, for each had hoped that field that could not be screened might make them safe in disposing of the old harridan, the Immor-

tal Sarn-Mother, who ruled them from a forgotten generation. She was a bitter, anachronistic hang-over from a forgotten time, from even the Forgotten Planet, and should have been forgotten with it.

"Aesir," said the Sarn-Mother softly, "took the Death of the Mother into his blackness, and seemingly drew strength from it. At any rate, both the apparatus and the atomic generator which fed it were blown out from sudden overload.

"It might be wise to cooperate more closely than in the past. Once, remember, our race had a very bitter struggle with this race. What do you Mothers of Cities believe this Aesir to be?"

The Mother of Targlan stirred angrily. "There are clowns among the humans of my district who amuse their fellows by trickery. Humans have stiff legs, bending only in certain, few joints. That lack of flexibility gives them amusing powers. They can, for instance, advance the stiffness by the use of poles of light metal, representing longer, artificial bones. I have seven such clowns walk on legs that made them not twelve, but seventeen feet high."

"Yes," said the Sarn-Mother sweetly, "the clowns of my North America are of a very inferior brand. They can appear but twelve feet tall. But—"

"Many," said the Mother of Bish-Waln, "of my humans have shown they can talk mind to mind among themselves. If it is new among your people here, it is—"

"Yes," said the Sarn-Mother sweetly, "the humans of my North America are of an inferior brand, evidently. But—I am curious of these clowns and mind-talkers. Do they, perhaps, absorb atomic-blast beams for nourishment, and warm themselves at a focused flame? Do they so overload your atomic-collapse field generators as to burn them in molten rubbish?"

"Or do they, perhaps, unlike yourselves, remember that the Sarn-Mother has watched humans, and the minds

and tricks of humans, for some eight times your not-inconsequential five hundred years?

"There were, in the Hall, humans, Sarn, and myself. By telepathy, Aesir spoke to us all, telling a myth of his origin among immaterial wills. He was, in his way, quite noisy, and quite conspicuous. Also, he was an excellent psychologist. Had I been warned—had I known beforehand and had time to think—I would not have turned the blast, the focused flame, nor, certainly, the Death of the Mother against him.

"Now do any of you, who see so clearly through the trickery of my poor little, twelve-foot clown, and the trickery of my slow-developing telepathist—do any of you see through to the message Aesir meant for my intellect, and not my mind? A message he did not speak, but acted?" The Sarn-Mother's elfin face looked down the Council table, and there was nothing of laughter in it.

THE City-Mothers moved uneasily under the lash of biting scorn. The Sarn-Mother's voice dropped, softer still, till the tinklings of the atom flame above muffled her words.

"Mummery for fools, my Daughters. I am interested that you are so attracted by the mummery as to forget the purpose, and so pleased with your cleverness that saw the human behind it.

"But I am—irritated that you underestimate, not merely of the mind of a human of deady, blazingly brilliant intellect, but, even more, my own mind.

"Humans are a smaller people, better adapted to this somewhat heavier planet than we are. But we are no longer on the Forgotten World. The humans have learned to respect height; the ruling Race is tall.

"Is Aesir a fool, then, to make himself yet taller, and to fill out his slenderness with vague blackness?

"We have no hair on our skulls, as have humans, but the more useful ster-

than which seems, to humans, practical telepathy, since we can talk among ourselves by what they know only through microwave radio sets.

"Is Aesir a fool, then, to use telepathy himself, talking truly mind to mind? Men know the limitations of microwave radio, that it ends at the horizon. But they do not know what vague limits telepathy may or may not have, and it is very wonderful, therefore.

"That mummery, my Daughters, was intended only for humans, that mass of restless humans who do not know what they want. That was not meant for me—save that he wanted me to know what others heard.

"I am proud of my humans, Daughters. But I am afraid, for you. You have not shown the intelligence that that Man expected. That mind telepathy he used was not the message he meant for me. To me he said: 'Mother, a new balance must be reached. You are the ruler of Earth—but for me. I challenge you to try your weapons—which I know, as does everyone on Earth, you have in your throne—and see if you can destroy me.' And when I, not thinking, but reacting spontaneously to the evident menace of his blackness, did just this, he said more. He touched Darnell, and Darnell fell dead. 'I have an impregnable shield,' his actions spoke, 'and it is more; a weapon. You cannot destroy me, Mother of the Sarn—but I can destroy you.

"Therefore, we seek a new balance. You could destroy all my people—but not destroy me. And I could destroy you, or any of your people.

"Release these two, Grayth and Bartell, and we will think again. This is not the time for hasty action.'

"Aesir, Daughters, is no fool. He is no trickster—save for his own sound purposes—but a mind of astounding brilliance. He has discovered a principle, a weapon, unknown to us and of immense power.



"And, my Daughters, I respect him. I released Grayth and Bartell, since they are, evidently, pawns in this game. Or, at least, they are two of the few humans on Earth I know are not—Aesir.

"And I have more liking"—the Sarn-Mother's voice was bitter and ironic—"for one who expects my mind to see beyond mummery to a deep and important sincerity, than for those who explain trickery and point out the inferiority of my humans."

"You are reading words that are not written," said the Mother of Targlan flatly.

For an instant the eyes of the Sarn-Mother burned with a white anger, a blazing intolerance of such sheer stupidity. Then it faded to a look of deep concern.

THE SARN-MOTHER was unhuman, unhuman in the same way her elfin face was. It was very wrong, taken as a human face, with its pointed chin and tiny mouth, the slit-pupiled, golden eyes, and peaked hair line that was not hair. But there was the fundamental parallelism of two eyes, a mouth, a high, rounded forehead. Her body was grotesquely unhuman, but again there was a parallelism of articulated arms carried high on a strong torso and legs, though her arms were like four powerful snakes.

And—she was un-Sarn. The Mother was immortal, an unchanging intellect in a world that waxed and waned and changed about her. She had living memories of a world crushed in cosmic dust. She had memories of great Sarn who had dared and won a world, of a human civilization of magnitude near equal to this present Sarn world.

And the process that had made her immortal, had made her unable to have descendants. There was no direct link from her to this newer generation. Her only link was through a planet wiped from the face of Time.

Four thousand years she had ruled

this planet. Two thousand more she'd lived on the Forgotten World before the desperate colonization attempt had been conceived. These creatures—these Sarn—were ephemeral things about her, for all their five hundred years.

Sixty centuries are long, for any intellect. All things exhaust themselves in that long time, save one: the curiosity of the mind, the play and counterplay of intellect. The Mother was the perfect seeker after knowledge, for no other thoughts could ponderably intrude. Those others she had met long ago.

She was un-Sarn by her immortality, by her separation of six thousand years from all direct contact with her equals.

She was unhuman only by a difference in body. And the body is wearied and forgotten in that time. Only the intellect, the mind, remains of interest, expanding and changing forever.

The intellect behind Aesir's cloak of blackness was the keenest, the finest, this planet had ever seen. And—that human appreciated that she, the Sarn-Mother, was a keen intelligence.

The City-Mothers did not.

The Sarn-Mother turned her eyes slowly from the Mother of Targlan. "The words that spell the secret of that blackness are not written," she said mildly. (*These were the daughters of her race. These were the descendants of Sarn she had known and worked with and liked during six thousand years. These were—*)

"I must see more of that cloak, and investigate it more adequately." She sighed. "And you, my Daughters, must not underestimate an enemy. And the humans are, I fear—or will be soon.

"They have been slaves for many generations—very short generations—and they have evolved. They evolve more swiftly than we, because of that short life span. And, remember this: at least one of them is sufficiently brilliant, of sufficient mental caliber, to develop a

screen weapon superior to anything we know of. That alone makes him, potentially, extremely dangerous."

## II.

THE City-Mothers sat silent for long seconds. The thought was, as the Mother had known, extremely upsetting. Their matriarchic minds rebelled at the thought that there was a human—and a *male* human, at that—who was capable of developing something scientifically superior to anything in their possession.

"If," said the Mother of Targlan, "he has this remarkable weapon—proof against all ours, and deadly to us—I am extremely thankful that he has shown such kindness toward our race." Her fluting voice was sugary. "He has not equipped any of his compatriots nor attacked us in any way."

The seven other City-Mothers twitched slightly straighter in their chairs and looked with pleased smiles at the Sarn-Mother's fine, small face.

The Mother smiled bitterly. "Undoubtedly that would be your own reaction were you possessed of such a weapon," she admitted. The Mother of Targlan stolidly continued to look into the Mother's half-angry, half-annoyed eyes.

"But you," the Mother explained, "have never done more than to say 'a thousand pounds of tungsten' when you had need of it. Or order fifty No. 27-R-29 oscillator tubes, when you hoped to make a satisfactory lie detector. Incidentally, Daughter, I have an effective invisibility generator. And your lie detector will not operate. You'd do far better to use common sense and simplicity instead of outrageously expensive mummerly that doesn't work. That spy you sent to—one of the other cities—last week had a very slipshod invisibility. I watched her a whole afternoon from here. She set off seven different alarms, and finally was caught in a delightful

booby trap. Your sister believes in simplicity instead of gadgets."

The Mother of Targlan sat silent and stony. Her slitted eyes contracted slowly in flaming hatred. The old harridan was becoming cattish.

The old harridan was tired. She was wearied to death of the bickerings and annoyances of these City-Mothers with too little to do to occupy their time. Furthermore, she hadn't slept in forty hours, and knew it. And the Mother of Targlan was being unbearably stupid.

The Mother of Bish-Waln was interested. So—that was the source of that spy. And the old Mother, for all her foolishness about these humans, had some sense. The secret of success is simplicity. Though that Targlan spy *had* had a fearful and wonderful array of apparatus strapped about her, it also had made her—even when dead—remarkably hard to see. She'd sounded like a collapse in a glass factory when she fell, though.

"TO GET back to my remarks," said the Sarn-Mother abruptly, "you have never had to want something without getting it. Except," she added with a flash of tiny, pointed, green-white teeth, "understanding. If you want materials, they are brought.

"If a human wants materials, he steals them. And I will say this for you: you have all been remarkable organizers. The antitheft measures you have developed are outstanding. But I should think that the fact that humans still succeed in thieving would convince you they are clever."

"So," snapped the Mother of Targlan, "are rats. But they aren't intelligent."

"Quite true," admitted the Mother. The Mother of Targlan was becoming annoyed, which vaguely pleased the old Sarn-Mother, who was very annoyed. "But humans are both. It took me twelve years to find exactly how it was approximately thirty ounces of platinum

disappeared each month, despite my electro-static balance detectors. Now I make all workers clip their fingernails and hair. It was truly startling how much dust they could carry that way.

"To acquire materials, humans must steal them. And they must find it extremely difficult to gather such things as metallic caesium, gaseous fluorine, and rare gases like helium and neon. Unfortunately, I believe a considerable quantity of material is obtained from ingeniously acquired atom-flame lamps." The Mother nodded toward the softly rustling lamps overhead.

"So your workers secrete complete atom-flame lamps under their nails?" said the Mother of Targlan. "Your theft measures are indeed remarkable. The atom destructor of one atom lamp would power a dangerous weapon; They will stand a load of nearly ten thousand horsepower."

The Sarn-Mother smiled. "How many atom-flame lamps have you lost through theft, Daughter?"

"None. Not one!" snapped the Mother of Targlan.

"And what," asked the Mother kindly, "of lamps destroyed in burning human homes?"

"Perhaps ten a year."

"I'd say five a year, then, are acquired by humans. I've proven two homes were burned to the ground to secure the atom lamps the occupants wanted."

"We," said the City-Mother loftily, "require that the wreckage be produced."

"Excellent," sighed the Mother. "An excellent provision. Do you have a chemist analyze the molten waste? The humans generally find it very difficult to obtain scandium, and the analyses usually skim badly on that. But the other elements you'll find. They smelt up a careful mixture of all the proper elements, with the exception of gallium. But they can always claim that boiled away."

The Mother of Targlan looked star-

tled. The Sarn-Mother's eyes twinkled slightly in satisfaction. She had discovered that trick only four days before, herself.

"As I said, the humans find it hard to get materials and apparatus. But they are really ingenious, and I rather respect them for it. If you wish to assure yourselves of your cities," she added, looking about the table, "I'd advise you to acknowledge the power of your opponents."

"That is the reason this human, Aesir, has not done more. He has a weapon and a protection—for one. So long as he cannot obtain material, he cannot do more."

"But he will obtain materials." The Mother's annoyed air was dropped now. This, she knew, meant the safety of the Sarn race. "If he obtains sufficient materials before we learn the secret of that cloak, *the Sarn will not rule this planet.*"





THE MOTHER of Bish-Waln looked at the Immortal steadily. Suddenly she spoke. "I have always considered the humans stupid. That they had the cleverness of other lower animals, in greater degree, I realized. But we, Mother, have no memories of their civilization before we came. How far advanced was it, actually?"

The Sarn-Mother looked at the City-Mother keenly for a moment. It was anomalous; this City-Mother, less than one twentieth the Immortal's age, looked far older. Her face, pointed in the manner typical of her race, was graven with fine lines. There was a power and strength of purpose in its deeply tanned, leathery molding. Ruler of a tropical continent, her city centered in the warmth and cloudless air of the Sahara, she was one of the most active of the City-Mothers.

The old Sarn-Mother smiled slightly and nodded. "I can tell you very little now. But call in your archeologist. She is a brilliant and learned Sarn. Briefly, when we landed, the humans had had civilization for some fifteen thousand years. It was, by their calendar, 1947. They had recently developed atomic power of the first order, involving vapor turbines heated by atomic combustion, driving electro-magnetic generators. They mined the world, their transportation systems were heavily interlinked and efficient.

"And—of our fifty-two ships, we lost thirty-nine during the Conquest. They were intelligent, efficient and deadly fighters. We captured and enslaved only the scum of the race; the best of humankind died fighting with a grim tenacity that appalled us. They were a fighting breed, slightly given to attack, but utterly and insanely given to defense.

"It is worth noting in this case. If they once attack us, then we will, of course, attack, in reply. Whereupon their inherited defensiveness will come

into play. If it does, I seriously assure you that, whether they have weapons or not, even if they fight with their bare hands, you will find the human race a perfectly deadly thing to tangle with. They have no conception of when to stop. It is good military tactics to stop, if any reasonably equitable settlement can be reached, after losing ten percent of your forces. The human race does not know that, and never will. They stop when, and only when, they are convinced they have won their point. They simply do not show good sense.

"But they are extremely deadly.

"That is true of the mass of humanity. They have leaders now, and Aesir is the principal leader. We can, and must, control them through him. He knows, instinctively, the attitude of his people, and will try, therefore, to prevent suicidal war.

"Wherefore, if we obtain the secret of his cloak of blackness, we can proceed."

"I will ask my archeologist, Mother," said the Mother of Bish-Waln.

"Whatever you may say of the dreadful, deadly, human race," said the Mother of Targlan ironically, "it would be interesting to know the mechanism of that shield. But—maybe he will not explain. And it would be extremely difficult to force him to, if what you say of it is true."

"We shall have to analyze it, of course," said the Mother wearily. There were many more hours of work and sleeplessness ahead. "Some hours ago I instructed my physicists to set up all the instruments they thought might be useful in the House of the Rocks."

The Mother of Targlan stared blankly; then, acidly, commented: "Of all places in the Sarn City here, I should say that that would show the absolute minimum of probability for an appearance of Aesir."

"And," continued the Mother, wearied of interruptions, "they will be ready for

him in about an hour and a half. It is evident that Aesir will come to the aid of Grayth, if we capture him. To make assurance doubly sure—since Grayth is not, actually, absolutely necessary to them—we will take also Deya, Spokeswoman of Human Women. Grayth plans to marry her, and I am sure that Aesir will aid in releasing her."

The Mother of Bish-Waln frowned slightly. "Is it not bad policy, Mother, to arrest, and then release this man again? And—again at the insistence of Aesir."

"Therefore, the House of the Rocks. No human can approach. No human will know of the actual escape—save those humans already closely associated with Grayth, and, therefore, Aesir. Those humans already know what powers Aesir has, even better than we, and they will recognize this maneuver not as an arrest that failed, but as a test that did not fail. Our policy will be good, not bad, to those who know. The mass of humans simply will not know."

"They will not, I suppose," said the Mother of Drulon, at the far, stormy tip of South America, "notice that Grayth, their Spokesman, is being taken in Sarn custody—and returns?"

"They will not," smiled the Mother. With an uncoiled finger, she pressed a tiny button.

AT THE FAR end of the long Council room, a silver door opened in the jet black of the wall. The heavy metal portal swung aside, and a Guard snapped to attention in its opening, a giant Sarn standing over eight feet tall. Her powerful, supple arms were corded with the smooth-flowing muscles of a boa constrictor. Vaguely, her trappings indicated the rank of a Decalon—a commander of a Ten. Her cloak, though, was a deep, rich maroon, and in the center the gold, silver, and bright-purple metal threads wove a pattern that was the Mother's personal symbol.

And her face—to one who knew Sarn physiognomy—was not that of a mere Decalon. The slitted eyes were deep-set and widely separated. Her mouth was firm, and the face, small and pointed to human experience, was square and powerful in a Sarn. The golden skin had been tanned to a leathery, weather-beaten brown, crossed by a myriad of fine lines of character. This was no mere commander over ten guards.

"Decalon," said the Mother softly, "bring the Cloaks of the Mother, and your command. There is an errand."

The Decalon turned sharply, noiselessly, closing the metal door.

"Once," explained the Mother, "Darath Toplar was Commander-in-chief of the Guard of the Sarn City. She is now a Decalon. That is because there are but ten in my personal Guard.

"Now this is a time of emergency. I have revealed to each of you something of the things each thought a secret, and some of the things that I held secret. I am showing you the Cloaks of the Mother. That they existed, rumors have stated. They do. They have the properties the rumors suggest. Because it is necessary, they will be used."

The Decalon was back, behind her ten guards dressed in the same type of maroon uniform. Ten powerful, eight-foot Sarn warriors. On the face of each was stamped a keen, loyal intelligence. In the arms of the Decalon was a case of dark hardwood, inlaid with heavy, silvery metal straps. She put it down at the end of the great Council table, and the Mother's hand flicked out as her supple arm uncoiled to shoot a scrap of carefully cut metal the length of the polished table. The Decalon fitted it into a concealed lock with a motion of familiar dexterity.

The case, opened, revealed a space two by three by one-half foot. In it, racked neatly along one side, were twenty little battery cases, with coiled, flexible cables attached, and twenty

headsets, bearing curiously complex goggles. The case was practically empty.

The Decalon reached in, and with practiced movements passed to her command the goggles and battery cases. Then she reached more carefully into the body of the case. The reaching hand vanished. Presently, queerly section by section, the Decalon was wiped out, till only a pair of feet remained, dwindling off into space. These vanished as some unseen boots were pulled over them.

In a moment, only the City-Mothers and the Mother of the Sarn remained in the room—seemingly. The City-Mothers stirred uneasily. The eyes of the Mother of Targlan were golden fires of anger and chagrin. These—these picked eleven of the Mother's personal guard and spy force—knew every secret of her laboratories.

And the old immortal harridan knew them, too. Her crackling laughter must have been spurred a thousand times by the futile attempts and doomed plans the Mother of Targlan had made and thought over. The Mother of Targlan felt a rising pressure of helpless anger well up, an anger that was suppressed by its very helplessness. Even the satisfaction that the Mother was old, a cackling hag, was denied. For—salt on her wounded pride—the Mother had done, seemingly centuries ago, what the Mother of Targlan struggled with vainly! The Mother was a far better scientist.

### III.

IT WAS a very different Council room, this chamber where the Spokesmen of Man had met—an inner office of the elected representative of Mankind on Earth, the Spokesman of Man. It was a warm room, mellowed by a thousand years of time; ancient woods, waxed and cared for for ten centuries and more, had taken on a fine, soft patina. Long-slanting fingers of afternoon sunlight did not glare on cold jet

stone here; it was softened by the richness of the panels. Each was of a different wood; one from each of the continents, and one for each Continental Spokesman.

The great table in the center was worn in soft hummocks and swales by the arms of forty generations of Spokesmen, the thick rubberlike floor carven by their feet.

But as in the great Council room of the Hall of the Sarn in nearby Sarn City, here, too, atom-flame lamps rustled softly with dying atoms, whitening the light of the setting sun. Four men only were at this Council table, four who sat motioning, gesturing with a curious alertness, their faces intent. Yet—utterly silent.

Grayth, tall, lean, keen-faced Spokesman of Mankind, an elected representative who had won his honor by a keen understanding of the practical psychology of the men he represented before the Sarn-Mother, political leader of Mankind. Bartell, shorter, more solidly built Spokesman of North America, close friend of Grayth, who had stood beside him before the Sarn-Mother, when—Aesir—had come.

And Carron, the gigantic Commander of the Legion of Peace, the only semblance of an army allowed humans. A police force armed with tiny gas throwers capable of a single, stupefying shot, and rubber truncheons.

Also, one more. Darak, Grayth's Sub-Spokesman. He sat silent now, making occasional pothooks on a pad of paper, his round, uninteresting face bored and boring. Darak's office was appointive, given him at Grayth's order, for the blankly unimpressive face and uninteresting character of the man made him few friends—as he had found by many years of careful study of the subject. Few friends, and few who paid him any attention whatever.

Darak had no need of the Cloak of the Mother; his own, based not on laws

of physics but of psychology, was nearly as effective. People did not see Darak. He wasn't worth seeing.

Four humans at the ancient Council table, four men as free as possible in this day of the Sarn, each wearing on his cloak the symbol of his rank in human society. Each wearing on a band round his forehead the medallion given every human at the age of eighteen. The band of Manhood or Womanhood, the Sarn informed them. The mark of Mankind's submission to the Sarn.

Or was, till Ware made certain slight alterations, alterations that hollowed out the solid three-inch disk of silver to contain a minute thing of spider-web coils and microseopic crystal oscillators. The first of the telepaths that rendered this soundless Council meaningful.

And rendered quite useless the listening devices that had followed every Council of Mankind for a thousand years. Grayth smiled upward to the swell of the atom-flame lamp. In the mechanism of that device, in a dozen other places in the room, the Sarn had long ago hidden radio transmitters. For a millennium, every Council of Mankind had been directly open to the strange radio-sense of the Mother and her advisers. For the hairlike growth on the Sarns' skulls were the sense organ of a type Man did not have, directly sensitive to radio.

"Four men in here," Grayth thought to his companions, "four men rustling papers. But the Sarn must be very curious as to the silence."

Carron's broad, tanned face broke into a wide grin. "After a thousand years, a bit of silence from this room is due. The Mother knows well enough we aren't minding her business. But I don't think she'll be anxious to investigate after—Aesir."

"The Sarn-Mother," the thought whispered in their minds from a more distant telepath, "is busy holding a conference of her own. I've been trying

for weeks to get the pattern of Sarn thoughts. I get annoying flashes, but no more. The Mother is tired, and the City-Mothers are being stubborn, I gather. But the thought patterns are just enough different from human thought to make the telepaths ineffective at more than about one hundred feet. And the most assiduous electro-technician can't spend *all* his time tracing conduits in the Sarn Palace."

"I'd suggest you do absolutely nothing that an ordinary electro-technician wouldn't do, Ware," Grayth hurriedly advised. "And for Aesir's sake, stay home when you're supposed to have off hours."

"HAVE YOU reached any conclusions? I've been sleeping, and woke only a few minutes ago." Ware's mental voice seemed to yawn. "I've been trying to think of some way to get more metal. Ye gods, if I could just get into one of the Sarn electrical plants for a day, I'd have a dozen things I need fixed up. The math was none too simple, but I've gotten it, I think." He chuckled. "Thanks, in fact, to very wise old Sarn."

"Just below conscious level, a thought came to him, a bothersome equation. While a certain electro-technician fussed with conduits fifty feet away, he fussed with the equation. The Sarn have some mathematical methods our ancestors never developed, and that I haven't had a chance to learn. Carron, if you ever feel urged to crack the skull of old Rath Largun, spare him for that."

"Can you use him again?" asked Carron amusedly.

"Oh, I have. He's old, and his mind wanders. Nearly a thousand years old, I think, which is exceptionally old for even a Sarn male. Since he is a male, he gets less credit among his people than he deserves, but he's the most brilliant mathematician the Sarn have. Because his mind wanders—he believes



he thinks up the equations."

"Might they give him a clue later?" asked Grayth sharply.

"T . . . P . . ." said Ware easily. "What word am I spelling? When you have correctly answered that, the Sarn may get that clue."

"Good." Grayth nodded silently. "Ware, Carron has seven technicians in his Legion of Peace who will procure some of those things you need. They have volunteered."

"I have not said what I wanted, nor will I," Ware answered instantly. "Every technician caught stealing metal now will be destroyed by the Sarn instantly. No man is going to lose his life on something I wouldn't attempt myself. Further, we need two classes of men now more vitally than ever before: technicians and fighters. Humans haven't fought and are not fighters. Carron's Legionnaires are the only trained, experienced fighters—with the will and emotion needed for fighting—that we have. And when they are also technicians, we can't spare 'em."

"Have you told Darak—what's to be done, and given him the disks?" Ware changed the subject abruptly, with an air of "that's that." It was because Carron didn't know what metals Ware wanted; had he, he would have gotten them somehow, anyway.

Darak replied softly: "I have been told, and I have the disks. Twenty-five telepaths, each equipped with destroying apparatus reacting to one key thought. I know how the destroying mechanism is to be disconnected if successful delivery is made. Grayth has supplied me with sufficient official dispatches for both Durban City and Targlan. I am starting in twenty-two minutes."

"Then—good luck, Darak."

"Thank you. The wish is, perhaps, the luck of the gods?"

"Yes. The luck of Aesir—very ap-

propriate." Ware chuckled. "You will lose contact with me, except when I use the large telepath here in the laboratory. You know the schedule hours for that?"

"Yes, thanks."

"We will be going, too, I think." Carron rose ponderously. His huge form dwarfed even the great Council table. And, since he spoke for the first time, his heavy voice seemed to explode in the room. "I'll see you to the Sarn City gates, Darak."

HE GLANCED down at the Sub-Spokesman's busy fingers. They were chubby, soft-looking fingers, rather thick and clumsy. An ink bottle flickered and wavered in and out of existence under the flicking, incredibly deft fingers. Then it flickered, without seeming to move under his caressing, chubby hand, from a round, red ink bottle to a square black one. "Thank you, Carron. The dispatches, Grayth?" Darak's voice was rather high for a man, quite undistinguished. Darak was, next to Ware, the cleverest human on Earth in that era. But his mentality was as utterly different as was Grayth's. Grayth was a practical psychologist, the only living man capable of unifying and moving the masses of Mankind. Ware was the scientist, the epitomization of centuries of the Sarn efforts to develop capable human technicians. And Darak?

Darak had the curiosity of the scientist in Ware, the psychological sense of Grayth, and the love of action that made giant Carron what he was.

Grayth tossed a mass of papers toward the Sub-Spokesman, a mass that bulged and crinkled. Darak leafed them swiftly into a brief case that he carried. "One thing I will have to remedy," he telepathed silently. "The metal gleams." Twenty-five silvery disks flickered momentarily among the rapidly leafed papers, and vanished as his thick fingers passed them. "All

here," he said aloud. "Good-by. I should be back in about four days."

His feet made no noticeable noise on the floor—an accomplishment far more difficult than a soundless tread. An unnoticeable step involves exactly sufficient sound to satisfy the ear, without enough to attract it. A soundless tread is very startling, particularly in a rather stout, heavily built man.

He walked through the outer office, past a battery of secretaries and clerks working over statistics from all the human world, correlating and arranging them for Grayth and the Human Government. Two looked up as he passed, but neither saw him. They missed him as completely as they missed the passing of eleven eight-foot Sarn Guards walking past in the opposite direction on the soundless toe pads Nature had given them. For neither party wished to be seen, and each had its own unseen cloak wrapping it.

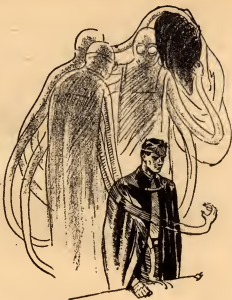
The door stood open a moment as giant Carron and Grayth spoke a few last words. Bartell stepped out, and then Carron, holding the door wide for his own exit, lingered a moment longer. Soundless feet carried the three Sarn, larger even than Carron's six feet six, through the door.

The door closed behind the Commander of the Legion of Peace, and Grayth stood alone, silent. "Aesir—Aesir—Aesir—" his telepath was sending out.

"Yes?" snapped Ware.

"Three Sarn are standing in the room, invisible to me. Eight more are in the outer office. Both Carron and Bartell are trying to call you—they stood in the door delaying the entrance of the invisible three. All are invisible. Their thoughts I can detect, but not decipher."

"I know. I've learned to 'hear' their thoughts. I takes a little adjusting, due to the different patterns. I'm trying to get them now. Too distant. I don't like it."



"Grayth, Spokesman of Man." The Decalon spoke from the air in the curious accents of the Sarn, speaking the tongue common to humans and Sarn.

Grayth started, looked about him, shook his head violently, and reached for a call button with a look of unhappy doubt.

"Stop," snapped the Sarn. Grayth's hand halted in midair. "The Sarn-Mother sent us for you. Stand up."

"Wh-where are you? Are you—"

GRAYTH stopped abruptly. A Sarn's powerful, muscle-corded arms gripped him suddenly, and simultaneously an intense blackness fell over him. A blackness more utterly complete than could have been produced by any substance thin enough and flexible enough to give the clothlike sensations that accompanied it. A very faint, rubbery rustling sound came to his ears, and simultaneously the jerking and pulling of the Sarn Guard adjusting the cloak.

"We wear the Cloak of the Mother," the Guard fluted sharply. "You will be quiet. You will make no sound, say no word. It is understood?"

"Yes," sighed Grayth. Then silently: "You've caught my impressions, Ware?"

"Yes." It whispered in his mind, the reassuring solidity of another human in close contact. The blackness, the utter blackness, baffled and brought a welling of panic. The huge, corded arms of the Sarn, the secrecy of this invisible arrest, all brought a feeling of irrepressible panic.

Then Ware's calm mind obtruded powerfully, silently. "The blackness is not related to mine. It is caused, I suspect, by the complete refraction of light about your body. To be invisible, you must be rendered blind to visible light, since any organ capable of seeing must, by its nature, intercept light. Struggle slightly. Strike the face of one of the Guard."

Grayth shuddered. A Guard was working swiftly at his feet. A tremor passed through him, and for a moment he fought off the powerful arms, surprising their grip by a sudden thrust and a gasp as of panic. His arm flailed out gropingly. Then with a second gasp, half sob, he quieted at the soft, tensely sharp command of the Decalon.

"Goggles," said Ware softly. "Transformers, probably, operating on ultra-visible light, thus making vision possible with invisibility."

Tensely, in Grayth's mind came the impression of half a hundred other human minds attending this exchange, half a hundred humans throughout this central city, the Sarn City, capital alike of human and Sarn affairs.

"You must stop them," Grayth felt a mind whisper urgently. "Ware—you must release him. Secret capture—they hope to lose him where Aesir cannot find him to release him." Deya's mind, turbulent and fearful, now. Leader of Human Women, determined and ready to defy the age-long, mind-burdening hold of the Sarn, this sudden, half-magic descent of the invisible Guards terrified

her for the sake of the man she loved.

"Stay where you are, Ware," Grayth rapped out mentally. "They're moving me now—leading—no, carrying me out through my office. In thirty seconds, I'll be lost utterly; the darkness is totally blinding and bewildering." Grayth felt solid ground under his feet suddenly, then he was standing, and spinning in the four cable arms of the giant Sarn. The darkness spun madly about him for a moment, then he stood waveringly on his feet, without the faintest idea of position as powerful arms urged him forward. "Stay where you are. I don't know where I am, anyway, and I'm convinced this is intended as a trap to bring you where the Mother's prepared weapons can destroy you and all hope of the revolution. She wants me only as bait for you. Stay!"

Softly in Grayth's mind came Ware's easy chuckle. "If I knew where you were, my friend, I would come. I will know soon enough. In good time, the Mother will see that you—and hence I—know. She realizes you have telepathic communication with me. Never, to my knowledge, has she revealed these invisible cloaks—"

"There have been other unexplained disappearances; this is the first time a telepath has been available to carry word," Deya snapped out.

"No matter. In good time, for no force, no power, nor weapon or ray, no bomb or any other thing can serve to disrupt the—Cloak of Aesir. No energy, however great, can break down that shield. That is not the Mother's hope, for this morning in the Hall of Judgment she tested that cloak to all her powers—and one or two, Grayth, no other Sarn of all Earth knows, save the Mother alone. It did not fail then, nor can it. She makes no further trial of it, but wants an analysis of its forces." Ware's easy jubilation rode through to Grayth, lessening the tension.

"She will not learn one iota of that,

Grayth. No, she wants a demonstration, a demonstration on her own terms, at her own time, in her chosen place. By Aesir and all the gods of Earth, Grayth, we'll give her the demonstration she seeks. By every god from Mithra to Thor, we'll give her one. I'll chill her prized palace there on the Sarn Hill till her old bones ache. No Sarn yet ever had rheumatism, but, by Earth and Man, we'll find out this night whether a Sarn's thousand bones can't breed a mighty case!"

"YOU'LL stay where you are, you braggart fool," Grayth howled through his telepath. "You are the revolution, not I. Bartell's an abler man, if he does lack a bit in fine words and simple phrases. The Sarn-Mother's lived five centuries to your year; she has studied space and time and all of energy with tools and instruments you never guessed, or will guess. You are a child, a prattling fool of a child, to her, Ware. Stay where you are! You may not know of any way to analyze or defeat that shield of yours, but what do you know of the Sarn's ten-thousand-year-old science?"

Ware's bubbling laughter echoed queerly in telepathy. "All Sarn science, Grayth, that has been published. The telepath, my friend, is not without its powers as an educator, tuned inward to catch, amplify and reflect each thought to a solid impression. And all human science, Grayth. Under my house—when I was trying to make a lab the Sarn wouldn't find—I found an ancient subway and a buried lab some striving humans had contrived in the last days before explosives and gas killed them. Books and periodicals, tons of them, heaped clumsily. A forgotten legacy."

Grayth groaned. The skin of his back seemed suddenly oppressed in the queer manner a telepath contrives when absolute rapport is established between two powerful minds. A heavy pack strapped on Ware's back. The screaming hiss

of an atom-flamp lamp unit readjusted, rebuilt to carry a million times the load its had been designed for, a scream that vanished in inaudible shrillness. Sketchily, waveringly, the rock-walled, hidden laboratory of Ware's contriving stood out before Grayth's eyes, lighted against the utter blackness that shrouded him. Then that, too, became a blackness, a stranger, straining blackness and chill as Ware pressed a contact at his belt.

"Ware," pleaded Grayth, "I don't know where I am. If you don't promise now to stop this expedition at least until I give further intelligent information, I'll grind the Mother's medallion under my heel, and by the gods, you'll never know."

"I'll wait," sighed Ware.

"But—you'll go later, Ware—you'll go?" demanded Deya.

"I'll promise that, too, Deya." Ware's mind smiled to her.

"Grayth, I shall continue." Darak's thoughts, faint with distance, came in.

"Right," replied Grayth. "Bartell!"

"Yes."

"And Carron and Oburn, Tharnot, Barlmew, Todd—all of you, continue your duties, without any change or shift. Do not hint you know of my disappearance till the appropriate time. Todd, you take charge of that outer office; you did a good job, apparently, when you knew I was being carried by, invisible, ten feet from you. You are in charge there. Keep the girls out of my inner office, for any reason, until I can give some idea of what is to take place. Got it?"

"Right."

"Deya," said Ware, "has stopped sending. Further, she does not answer; she's blanked her mind."

"We've been walking—stopped now!" Grayth's mind raced. "Deya . . . Deya, answer me!"

THERE WAS a tense silence of mind; only the low, multitudinous mut-



ter of a thousand human minds in normal thought about him.

"Oburn, where are you?" snapped Ware.

"At home."

"Stroll out in front; you live within three doors of Deya. Grayth, stumble in the dust—do you feel dust under your feet?"

"Yes." Grayth stumbled awkwardly against a giant Sarn Guard, dragging his foot sharply across a dusty walk, unseen.

"Dust rose," said Oburn softly.

"Deya, will you answer me?"

"Yes." Her telepath thoughts were half-angry, half-miserable. "We're moving again, though, so—they spun me. I don't know which way."

"You will stop dragging your foot."

A Sarn voice low and tense in Grayth's ear warned him.

"Ware, I . . . I don't like this." Grayth's thought was tense and very worried.

Deya's was bitter. "It was well enough when you were the one; now you are not so anxious Ware stay back, I take it. Ware, you stay right where you are, because if that was wise for Grayth, the only one of us who can really move the men of his following, it is a hundred times wiser so far as I am concerned."

"I think," said Ware, annoyed, "that I had better start designing a telepath locating device. It should be relatively simple, and if this continues, we'll need one. I'll join you as soon as I know where you are. In the meantime, I have a little work to do preparing. Please stop ordering and counterordering. We need you both; the Mother wants to study this apparatus, and she won't stop taking people until she gets the chance. It won't do her any good whatever, so she'll get that chance."

"I fear you're right," Grayth agreed. "It should be getting dark now."

"It is. The moon rises at 1:45, so

we have plenty of time. I think . . . I think it is going to be heavily overcast," predicted Ware suddenly. A chaos of thoughts raced suddenly through his mind, thoughts too lightly touched for others to follow.

#### IV.

UTTER JET, and the sound of people moving, voices and low laughter. Hasty side-steps to avoid unseen passers that brushed by, feet sounding softly on the dusty walks or grassy lanes. Then rough cobbles under their feet, rounded by the tread of more than a hundred generations of Mankind, and behind them, the low murmur of the Square fading away.

The rough cobbles gave way, suddenly, to the smooth, glassy pavement of the roads of the Sarn City. They had passed the low, ancient wall that marked the boundaries where men might walk unchallenged. Only low, sleepy cheeps of birds in nearby park-like gardens now, and the shrill notes of crickets and night insects tuning up.

The pace of the Sarn Guards accelerated, their long legs, and the curious manner in which they retracted them with each step, making a pace swift for the humans to match. Grayth heard Deya's soft breathing accelerate as they moved at a near trot up the slow rise that led to the Sarn Palace.

Then steps under his feet, strong Sarn arms guiding him upward, steadying stumbling feet. The echo of corridors answered to his tread, and for an instant he knew where he was; this was no unfamiliar walk to him now, and he was mentally readjusted. To the right, then, and a half dozen turns, and he was beyond any area of the vast, sprawling Sarn Palace that he knew.

An arm detained him; he stood motionless in utter darkness, while, beyond, something hummed for an instant, then a soft shuffling of a sliding door, two

steps forward, and the soft clang of the door's return. The sensation of a sudden drop in a swift elevator was nerve-tearing in this darkness, this total unknowingness of place, time or intent of captors. Grayth stiffened, heard Deya's soft gasps as the floor seemed cut from beneath her. Then the steadiness of the floor returned, and only the soft humming of the gravity controls told of their movement downward. Time became confused, there was no clue to their speed, yet Grayth was certain that they dropped many thousands of feet. The air pressure mounted till swallowing had relieved it so many times he lost track of that crude barometric method. More than five thousand feet, though—

More than a mile! No human had ever guessed at the depths of the Sarn Palace. Only once had humans ever been permitted to see those depths, and then it was the upper caverns only, when Drunnell and his men had been given a few feeble weapons by the Mother's orders. Weapons to overcome Grayth and Ware.

"More than a mile—we're slowing, Ware. The air is thick; it must be nearly two miles down. The air itself seems denser and richer in my lungs. Unless we are brought upward again—"

"I'll come down to you," Ware's calm mind replied. "Can you receive there clearly?"

"Perfectly," Grayth acknowledged.

"Two facts I wanted; antigravity units of the cars do not disturb the reception. Two miles of solid rock do not disturb it. Thought waves are a level below all known radiations, a force unto themselves. The Cloak of Aesir stops all other things."

"We are walking down a corridor, wide, rock-floored and walled, low-ceilinged. There are columns," said Deya. "Ahead, I hear Sarn."

THEY HALTED, and the echoes of their feet died away slowly, the curious

*zing-zing-zing* of sound reflected from rows of columns disappeared in unknown, unseeing distances.

"Mother of Sarn! Decalon Toplar reports with her Ten, and the two humans for whom she was sent," the Decalon's fluting voice called out.

"Remove the Cloak of the Mother, Decalon. Place all of the Cloaks in this case, and with them the visors."

A giant Sarn tugged at Grayth, the curious rustle of the cloak rose about him, then abruptly he was blinded by a flood of intolerably brilliant light. Gradually his eyes adjusted themselves; it was no more than normal illumination from a score of giant atom-flame lamps set high above in the arched and groined stone of the ceiling. Black, glittering, granitic rock, studded with two huge plaques on opposite sides. A twenty-foot disk of gold mapping Earth, a twenty-foot golden disk mapping the Forgotten Planet. From a concealed atom-flame lamp in the lofty dome, two projectors shot stabbing rays against the golden disks. On Earth's, a ray of brilliant yellow-white; on the other, a ray of dim, chill blue.

The Mother sat on a Chair of State, about her the eight Mothers of the Cities and a score of giant Sarn Guards. From air, eleven more were emerging, as Deya emerged piecemeal, while goggled Sarn packed into the silver and hardwood case on the long table something unseen and tenderly treated. The Decalon stood by the case, tucking unseen folds carefully into its corners, taking goggles and batteries from the Guards to place on tiny pins.

"It is the Given Law that no being, human or Sarn, shall twice be accused of a single thing," said Grayth. "This morning in the Hall of Judging I was tried and acquitted. It is the Given Law that no being, human or Sarn, shall be brought for judging without an opportunity of defense, and twenty-four

hours of thought, save he waive that right.

"Neither I nor this woman, Deya, has committed any offense against any being, human or Sarn. As is our right, we ask our accuser to appear and explain before us and the Mother the reason for this arrest."

The Mother's slitted eyes closed slowly and opened sleepily. Her powerful body remained as motionless as the stone of the Hall; the Mothers of the Cities neither moved nor seemed so much as to breathe.

The Mother spoke in the fluting tongue of the Sarn. "The Given Law is the Law of the Mother; by it I have promised to abide, save in time of emergency. This, Grayth, is such a time. You, this woman, and perhaps certain others have sought to plot against the Sarn and the Sarn-Mother. That is the accusation; I am the accuser. What answer do you make?"

"If one be brought before the Mother, and faced with his accuser, he has then twenty-four hours to consider his reply. The accusation must have evidence enough to make it seem just in the Mother's eyes that an answer be made, and complete enough that the accused know why this thing is charged.

"The Mother is the accuser, but I may ask—by the Given Law—what reasoned facts bring forth this accusation."

THE MOTHER'S eyes sparkled. Almost, a smile touched her tiny lips as she looked at Grayth's keen, gray eyes. The Sarn were proud that never in the millenniums of Man's enslavement had cruelty been applied, nor intentional injustice. Where the law of the Sarn could apply logically to humans, both races worked under the same law; where—as in the nature of two races such things must be—the laws could not apply identically, justice had been applied.

The Sarn were just; no human could

say otherwise. The Sarn-Mother's age covered sixscore generations of Mankind, and to some extent her immortality removed her alike from human and Sarn. Wherefore, it was easier for her, who had known Man's greatness, to appreciate the keenness and strength that lay in Grayth's stubborn face. And, knowing Mankind, to appreciate the steadfastness with which he would fight by every law or trick of law to win freedom back for Deya.

And—she appreciated the searching quickness with which Grayth had forced her once again on the defensive. Her case was true and solid—but made of ten thousand thousand little things, of things that had not happened as well as of things that had. Of subtle, reasoned psychology—and not half a dozen solid facts. Of those few, three were ruled out of this consideration, because they had been dealt with in that earlier trial, when Grayth was released.

She had no time to argue now with a mind that she knew was fully as keen as that of her own City-Mothers. There were other, more important things afoot, as that gray-eyed man well knew. And he knew as well as she that her case was not a thing to be stated in a dozen sentences. And also that it was a perfectly just, though unprovable, accusation.

"This is a time of emergency, Grayth," said the Mother softly. "I will give you the twenty-four hours you demand, however. And your companion, Deya.

"Decalon, let these two be taken to the fifteenth cell in the House of the Rocks."

The Decalon and her squad of ten moved forward. Grayth turned to Deya, a slight smile on his lips, as the Ten surrounded them. Back toward the great pillared corridor leading off into unseen distances, lighted by dwindling atom flames, the Guards led them.

"The House of the Rocks. This, then is the rumored prison of the Sarn.

Ware . . . Ware—" Grayth called mentally.

"I am coming, Grayth. I will join you in an hour. You need not call continuously as I have made rapport with you and can follow your normal thoughts. The sky, as I suggested, is becoming overcast. It will be a very dark night."

"We would not leave unaided," sighed Deya.

"I do not believe it would be probable." Grayth laughed uneasily.

GRAYTH MOVED about the cell restlessly. The Decalon and her squadron were gone, down that tube that had brought them. The single huge old Sarn that served as warden, turnkey and guard had set the tumblers on the steel door, and left with soft, shuffling toe pads.

Grayth stopped in the center of the room, his head high and tense, furrows of concentration on his forehead. Deya, in her chair, sat motionless, her deep-blue eyes clouded in sudden thought. She rose slowly, a magnificent throwback to a race five thousand years forgotten, a viking's daughter, bearing a golden tan of the more southern sun of this region, but golden-haired and blue-eyed, tall and powerful.

Slowly her eyes cleared, and a slight frown of understanding met Grayth's eyes. "At least a dozen. And if those Sarn are prisoners here, then all the Mother's laboratories have been stripped of talent," she said softly.

"Echoes," thought Grayth sharply. "Do not use voice."

Deya smiled. "They do, and yet no intelligible word is audible. The echoes do not carry words; they carry sounds, confusing, blended, intermingled sound. And concentration on telepaths might make impressions on instruments, where normal thought did not. Perhaps speech is better."

Grayth nodded. "There are a dozen

Sarn, at least, all scientists. They are in the cell above, the cell below, the cells on each side. And the only clear things of their thoughts that I can make is—Aesir—and instruments."

"I've found that shaft," came Ware's thoughts. "I haven't traced every circuit of the Palace for nothing, and as the Palace electro-technician, I've found many that were not on my charts. The sky is becoming heavily overcast. It will be very dark indeed. I will join you shortly."

## V.

THE MOTHER pointed silently. Across the room, a section of rock had swung aside, and a broad signal board was revealed. A green light blinked irregularly, then went out. A blue bulb winked for a moment, and died in turn, as a yellow bulb glowed steadily. "By the shaft, then. The air is not open to him."

The Mothers of the Cities stirred restlessly. A second yellow light flashed. "If he goes below the sixth level—" suggested the Mother of Durban.

"The cage will remain down there, but probably he will not. He walked through a solid wall once; he may walk through solid rock." A third and fourth bulb flashed. The Mother watched quietly; the Mothers of Cities tensed as the fifth lighted. Abruptly it was out, and in sudden succession the blue and green bulbs winked.

"He knew," said the Mother, almost approvingly. "The car did not fall. Go."

A section of rock wall swung open. Silently the Mothers of Cities vanished behind it, and with them went the tall figures of the Guards. The rock swung to. The Mother, alone on her tall throne, saw a darkening of the farther lights of the long corridor.

Aesir stood again before the Mother, a blackness, a thing that was not black, but was blackness incarnate. A thing

some seven feet in height, vaguely man-like in form.

The Mother's thin lips smiled. "You have shrunk, Aesir. Have some of those billions of wills you mentioned left you, then?"

A voice stirred in her mind, a respectful, yet laughing voice. "Perhaps that may be it; a few wills more of cold metal than warm human flesh. But for the good of my race, two wills you hold captive must be freed. For this I have come again. And—perhaps that you and those who wait in five adjoining cells may know me somewhat better.

"I am the crystallization of a billion, and more than a billion wills, Mother of the Sarn."

"There are no humans here; the Sarn need no such tales." The Mother moved annoyedly.

"It is no tale; it is pure fact. This blackness is their product, not as, perhaps, I might explain to humans, but still their product." The voice that stirred soundless in the Mother's mind smiled.

THE MOTHER nodded slowly in comprehension. "Wills and knowledge. That may be. We seek a new balance, you and I."

"We seek a new balance, your race and mine," corrected that blackness. "You and I might reach a balance in this minute, if it were we two alone. The balance would be—that your pan went down to a depth that none, neither Sarn nor human, knows, while I remained."

"Yes," acknowledged the Mother. "I might be wiped out, and you remain. But your race would go, and mine remain, save that you alone continued."

"There is no need to exchange these thoughts; each knows the other to that extent. Man has one great advantage over Sarn; that, as a race, Man is more nearly developed to universal telepathy. A few of my people can already talk

among themselves; I have learned the different pattern that is Sarn telepathy. I can speak with you as Grayth cannot."

"Though he appears aware of Sarn thoughts when near us," sighed the Mother, "I had not thought of that."

"We make an exchange now," Aesir's thoughts laughed. "You wanted observations of my . . . my body stuff. I will give you that, and in exchange—"

Aesir stepped forward, and swept from the long table the silver case that contained the Cloaks of the Mother and the goggles. Simultaneously, the Mother's finger moved, and a carved bit of her high throne sank under it. From unseen projectors, a shrieking hell of flame screamed out, intolerable—blasting—The rocky floor of the great chamber screamed and puffed out in incandescent fury. The great table boomed dully in the corridors, a sudden, expanding blot of livid gas. The mad shrieking screamed and thundered down the corridors, the floor of the vast cavern slumped in annihilation that speared down through a hundred feet of rock in a single second of cosmic fury—

And died in silence. The Mother dropped three curled arms before her face, blinking tear-blurred eyes. Aesir stood, blackness against fiery incandescence of the cooling rocks, unsupported in the air. His form was altered, a clumsy thing with a strange, angular belly. An almost rectangular protuberance. But the thing was not rectangular; one corner was twisted and bitten away.

"I never knew," said Aesir softly, "but I am certain now; the world of the Sarn was not so heavy as Earth. You move slowly, Mother."

Silently the blackness glided down the corridor, dwindling from the Mother's sight. Furious golden eyes glittered after the hunched, disfigured mass. Slowly the glitter faded from her eyes, and a concentration of thought appeared,



perhaps even a mischievous twinkle of approbation.

The Mother's finger touched another button, and instantly a score of tense-faced Guards leaped through the door, clumsy-seeming, funnel-mouthed, hand weapons ready. They stopped at the door, staring at the fiery incandescence in the floor.

The Mothers of Cities crowded through their ranks, a slow, dawning smile of satisfaction on their thin lips as they looked into the glow. The Mother of Targlan took her seat slowly. "Then the revolution is ended," she said with soft satisfaction.

The Mother turned angry eyes on her. "Daughter," she asked bitterly, "do you think I mount here weapons of the power I have in the Hall of Judgment? I did not turn that weapon on him—but on the Cloaks. No more than a corner of them did I get; he moved too swiftly. My thoughts have been disturbed in this emergency, and I have not rested in fifty hours, or I would never have left that case where he might reach it.

"Aesir must win on this exchange, for he *will* know what makes the Cloak of the Mother, while I *may* know what makes the Cloak of Aesir." The Mother looked calmly down the long corridor, where a figure of hunched blackness turned into a narrow cleft in the great wall of the rocky tunnel.

## VI.

THE OLD Sarn Warder of the House of Rocks had been instructed. The Sarn-Mother had no desire to lose Sarn lives—and she wanted Aesir in that grim citadel. The Warder, as Aesir appeared, turned away and left the passages open to him. The invisible Guards at the narrow cleft that led into the impregnable citadel remained inactive, wrapped in invisibility.

Up the stairways carved in the glint-

ing rock the Blackness strode. Down the corridor to the gray steel door behind which Grayth's and Deya's minds acted as directive calls.

And—between ranks and files of recording instruments let in every wall, in every doorway he passed. Tiny atom flames finer than the slimmest wire reached out to touch and feel at the black texture of his cloak. Unseen force fields caressed delicately at the fringes of blackness. Bolometers and thermometers felt and sampled the chill that poured from the blackness. Frigid air, like chilled puddles, flowed from that blackness and trickled across the stone floor behind him. White of frost coated the corridor pavement as he, in his dead blackness, passed.

"Grayth—Deya—stand back from the door. The door will fade to a vague transparency. Step through it instantly." Through the impenetrable blackness, the subtle mystery of thought reached out to contact and explain to the imprisoned humans.

The formless blackness of Aesir's hand waved stubbily over the gray metal of the door. As though that hand were a wet cloth, the door a chalked picture on slate, it vanished. Where the hand had passed in quick circles, the grim metal roiled and twisted—and vanished.

Deya's hand reached out uncertainly, touched the space where the door had been to feel a vague opposition, as though a thick and incredibly viscous gassy stuff remained. It was utterly without temperature sensation. She lunged through it sharply, overcome by an instant's strangling suffocation, then stood beside Aesir in the corridor. Grayth joined them silently.

"The Cloaks?" he asked.

"They are useless save for information. The Mother's rays cut through the corner of the case, and cut strange patterns in them, no doubt. You could not use them. We'll have to go out as we are. Now come, and stay close be-

hind me. We must put walls behind us, and that won't be easy."

"Can we go into the rock—or would that be impossible?" Deya asked.

Aesir's misshapen hand pointed. Behind them, the door of the cell was blackness similar to Aesir's own, a blackness rapidly congealing about two bent shadows overlapping on the surface. Two shadows where Deya and Grayth had passed through. A deadly chill was radiating from the door, a growing chill that sucked the light of the atom-flame lamps in the ceiling, and ice from the air.

"You felt that momentary suffocation. You can't breathe inside that steel, or inside rock. And that condition of interpenetrability is both temporary and frightfully treacherous. We'll have to go."

Ware went ahead, and now, as he passed the hair-fine atom flames that had probed for his cloak, a finger pointed and sharp cracklings of lightning snapped where the jet beam of blackness struck the probing beams. Harmless to Aesir's blackness, they were hairlines of death to unshielded humans.

The flames ahead on their course abruptly sputtered and went out. The Sarn saw no reason to lose good instruments.

Down the stair, and out into the glare of the great atom flames lighting the House of the Rocks. "There are invisible Guards," said Aesir. "The Mother, I take it, warned them to let me pass in unhindered. They may seek to stop you—"

IT WAS against the Mother's orders. But those Sarn Guards, in their eight-foot power, in their contempt for humans, in the pride they held that never had any being imprisoned in the House of the Rocks escaped, raised unseen weapons toward Grayth and Deya.

A long, stretching finger of jet shot out from Aesir's stubby hand. Something crackled in the air, darting light-

nings and a wild, many-toned shriek of agony chopped off abruptly. A Sarn figure black as Aesir's jet stumbled from nothingness and faded behind a swiftly formed white curtain of frost crystals. The black finger swept around, and the Sarn Guards died in blue lightnings and blackness.

"Run," commanded Ware. The three started down the straight narrow cleft that led to the outer corridor. Aesir turned right, then right again, into a low-roofed tunnel. Another elevator bank, the cars undamaged. The heavy, locked metal door faded under his hand to disclose a black shaft leading down and up in emptiness to unseen depths and heights. Another door—and another—

Then a car was found, and the three hastened through. Behind them in the main corridor a heavy pounding of running feet and clanking accouterments sounded. The blunt, dull-glossed nose of a war-blast swerved clumsily round the corridor with half a dozen giant Sarn tugging at it. Degravitized, it floated free, but its tons of mass were clumsy and hard to manage there in narrow rock corridors. Shouting, musical commands twisted it into place, settled it, and it thudded to the floor as the degravitizer was cut. Two Sarn swung the trajectory controls, and a third held the lanyard ready.

Aesir reached for the controls of the elevator cab as the blast roared in throaty fury at dissolving, flaming walls. The rock walls to the left and right flared into deadly flame of dying atoms. And the view was lost as the translucency of the metal door snapped instantly into blackness, a blackness that licked up the furious energy greedily and pulled with freezing fingers at the heat of the two human bodies within.

"That button, Grayth. Quickly. I cannot touch it through this cloak," Ware snapped.

Grayth pushed the thing, one among

a bank of hundreds. The floor of the cab pushed against them momentarily, then a sense of weightless falling gripped them as Ware's black finger pointed at something in the control mechanism. Blackness and frightful cold drained every trace of warmth from a resistor in the controls, and the full current drove through the deggravitator control. The car shot madly upward.

"The Mother has many of these cars wired with power cut-offs. If this is one—as it probably is—and she learns in time which car we took, she may cut out our circuit. If so—we still have one chance, though I have never dared try it."

"Better cut that resistance back in," said Grayth quietly. "Listen to the howl of the air above."

The shriek was mounting. Far above in the closed tube, compressed by the upward plunge of the tube-fitting car, the air was howling through some vent. It was a vast organ pipe that changed its tune upward, upward—more and more swiftly as the tube length shortened and the pressure mounted—

"I can't." Ware's hidden head shook. "The air pressure must stop us. But not until we reach the top of the building and the automatic safeguards go into action. They'll cut the current in the car and apply brakes as we pass the topmost floor. If the Mother hasn't already—"

THE SHRIEK mounted. Abruptly the drive of the car vanished. Grayth, already firmly gripping the carved cage walls, flung a protecting arm about Deya and gripped more tightly. Aesir tumbled upward toward the roof of the cab, inverted himself somehow in mid-flight, and hung poised.

"Don't touch me," snapped Ware's thoughts in their minds. "It would be death—"

A new sibilant hiss cut through the roar of the air in the tube above, and

Ware sighed in relief. "The Mother was too late. She cut the power—but not before we had come so high, and so fast that the automatic safeguards tripped. The emergency brakes have gone on."

The deceleration died, and Ware floated back to the floor. The car was stopped, was sinking slowly. It clicked again, and a ratchet locked somewhere beneath their feet. The door of the car opened with a rumble, and an outer door slipped aside. The three stepped out into a corridor, a corridor lighted by the atom-flame lamps of the Sarn, lamps carved in alabaster and golden amber stone. They were in the uppermost floor of the Palace of the Sarn.

Far below, the Sarn-Mother looked thoughtfully at the little lighted column of signal lamps. The City-Mothers followed her gaze, furious as they saw the double red bulbs of the safety guard signals go on. "I am curious," said the Sarn-Mother softly. "He froze the resistor in the deggravitator circuit with his blackness, surely, to get any such mad climb rate. But I have a thought that Aesir does nothing that he does not know some remedy for, nor attempt anything that he does not have some second, saving escape. What would he have done had I been able to cut his power before he could reach the safety trips?"

The City-Mothers were not curious. They waited impatiently as the Mother let seconds slip away without flinging a rank of Guards about that upper floor.

The Mother made no move. She saw no gain in throwing her Guards against the blackness, that, so far as she could see, had no weakness. She saw, rather, that her best policy was to wait the report of her scientists. Knowledge was the power she needed now. That, and the power she already had; control over all sources of the materials whose lack rendered Aesir harmless—so far as revolution went.

## VII.

AESIR stood in the entranceway of the Hall of Judgment. Behind, through the ever-open doors, the Gardens of the Sarn were visible. Aesir—Ware—smiled. "I said it might be an overcast night," his thought whispered softly.

Grayth and Deya shivered. The Gardens knelt before a wind that howled in maniac fury. In the reflected light that shone against the low-pressed sky, a wrack of storm boiled overhead. And it was cold. The wind that shrieked across the Gardens was a breath of savage winter cutting through this summer night.

"I think," said Ware, "that it will rain."

As he spoke the sky burst into flame. Vast tongues of lightning ripped across the sky, stabbing down to Earth in a mighty network of electric fire. The air exploded with a blast of thunder that rattled the mighty fabric of the Sarn Palace to its bones. Instantly the flood-gates opened. The clouds split up and tumbled down in liquid streams. The shouting wind lashed the water droplets before it in a horizontal spray that was half falling water, half water slashed from the ground that was suddenly a pond. The twinkling lights of the Human City beyond the Sarn City walls were suddenly gone.

"Perhaps," said Ware pleasedly, "I used too much."

"You?" gasped Grayth. "You did this?"

"The Sarn hate cold, and they hate the wet more than ever any cat did. You'll find no Sarn loose in the Gardens tonight. Our way should be clear to the gates."

Deya shuddered and looked at Aesir's blackness. "That wind is cold; that rain must be near sleet. And I am dressed for June—not a February night."

"I used too much power," Ware shrugged. "I never did this thing be-

fore. Put it down to inexperience."

"Experimental error," Grayth sighed. "Gods, man, you've washed the city away. Come, let's start before we have to swim."

"Not yet," said Ware. "I've something else to do. The Mother wanted to study this blackness of mine. Well, by all the gods there are, I'll give her all she wants. I'll make her think again before she summons Aesir for her pleasure!"

He turned about and faced into the great Hall of Judgment. It was magnificent beneath the dim light of a few big lamps. It was jet stone and chrome, gold and sparkling, inlaid crystal. Aesir's arm became a funnel of blackness that pointed in slow circles around the room. Where that arm passed, the sparkle of polished stone and shining metal or gem vanished. It became a dead blackness. The walls ceased to have the appearance of walls, but became empty spaces that stretched off to some eternity of night.

The glint and whisper of the atom flames died away; their strong light dulled to something somber and depressing.

And cold—cold welled out of the place in a tangible flood. The humans shivered violently and fled from the doorway that dripped, suddenly, with frozen mist. Puddled air, chilled near its freezing point, it seemed, flowed down the walls and out the door. A breeze sprang up, a throaty gurgle of air rushing into the room at the top of the great door to rush out at the bottom in a freezing, unseen torrent.

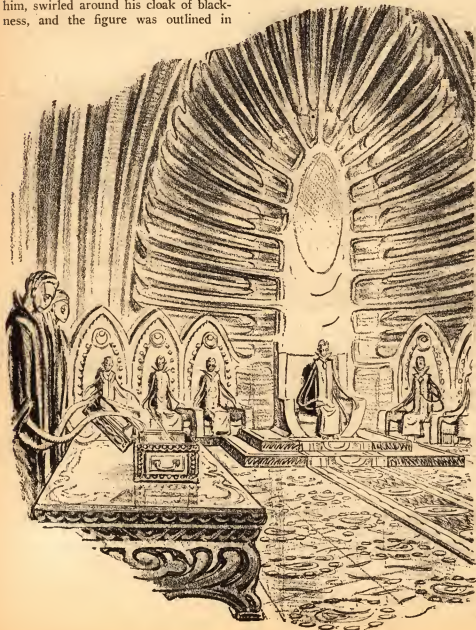
Grayth and Deya hurried aside, shivering in unbearable chill. The torrent of air poured out, across the vestibule to the entranceway of the Palace. It flowed down the steps, and as they watched, the howling rain turned to snow and froze as sleet on the stone.

"And," said Ware in satisfaction, "the

Sarn hate cold. It will be a month before that room is habitable again. Now come."

HE WALKED through the flood, and down the steps toward the wind-lashed Gardens. The wind howled by him, swirled around his cloak of blackness, and the figure was outlined in

white that swirled and glinted in the faint light radiated from the building. Behind him, Grayth and Deya made their way, white figures against the blackness. In a moment they were lost behind driving, glistening curtains of rain.





They were soaked and freezing in an instant. In his arms Grayth felt Deya shivering violently. "Ware," he called abruptly. "Ware—go on; we will meet you. We can follow that blackness only by the snow that forms around you, and on a night like this, may I be cursed if I follow a walking snowstorm. I'm

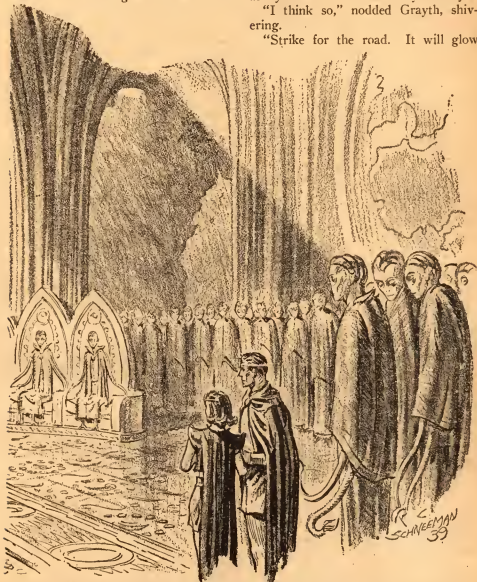
freezing now, and Deya, too."

"Frozen," the girl chattered.

"I can't cut off this shield," Ware answered. "The instruments aren't insulated well enough. If water touches them—there'll be neither Sarn nor Human City to squabble over. Meet me at my house. You can find your way?"

"I think so," nodded Grayth, shivering.

"Strike for the road. It will glow



*The Sarn-Mother smiled inwardly. "You shall have the twenty-four hours for thought, man." Then to the giant Sarn Guards: "Place them in the House of the Rocks."*

tonight, as usual. And there will be no Sarn upon it, with this liquid blizzard howling."

"Good." Grayth and Deya set out, half running. Black wind and water thundered through the Gardens. The sky exploded once more in blinding light, the waves of sound rocking the ground beneath their feet so that even half frozen as they were, they felt its shaking.

### VIII.

IN THE RUCK of that wild night, no eyes saw Grayth and Deya reach their goal. Rain in solid, blinding sheets hid them as they slipped between wind-bowed trees to Ware's small stone cottage; into its unlighted doorway. Ware's hand found Grayth's, and led the shivering, dripping pair through the tiny room, abruptly brilliant in the explosion of another lightning flash. At the far wall, Ware fumbled at a stone that grated and moved. Silently he led them down to a yet smaller room lined with rough granite. The stone above them swung back, and a light sprang up. But again Ware was fumbling, and again he led them down, down to a musty cavernous place, walled with age-rusted steel, supported by rusted columns of steel hidden at the heart of thicker columns—stalagmites and stalactites formed about and buttressing the corroded metal.

"The old subway," Ware explained. "It goes for a quarter of a mile in that direction and nearly a mile in the other before cave-ins block it. All, you see, beneath the Human City—and most at a depth of more than one hundred and twenty feet. My lab's over here." It was set up on the concrete platform of a forgotten station.

"But here—strip off those wet things and stand before these heaters." Ware turned to a crude control panel, and a network of iron bars grew warm, hot,

then faintly red as a welcome heat poured out.

"Do we hide," asked Deya softly, "or frankly return?"

"If," said Ware sadly, "I knew how much longer this queer status of half-revealed-half-concealed revolt was going to continue before I could get somewhere, we might be in a better position to know what to do."

"Which makes me wonder, Ware. Half-concealed-half-revealed, I mean. The Mother's Cloaks have the goggles to make vision possible. I don't know what that blackness of yours is—beyond that it is infernally cold; I'm still congealed—but if no ray can pierce it, pray tell me how you see where you are going."

Ware looked up, laughing. "I don't. Yet I found my way across that swamp called the Garden of the Sarn more easily than you, tonight. The telepath is the answer—I see through others' eyes. The Mother told me where her cloaks were hidden." He nodded toward the truncated case. "Without her eyes—I'd never have seen to reach them."

"Perhaps," said Deya, "if we knew better what you have, and what you lack, we could help more efficiently."

"Perhaps," suggested Grayth grimly, "you can wash the blasted Sarn out of their city. Another such 'overcast night' and you may do it."

"The Sarn City's higher than we are," Ware smiled. "But our people do stand cold and wet better than theirs."

"But," said Deya, "it isn't practical—nor fast enough. What have you there? My slowly thawing bones give me a very personal interest in that cloak of yours."

WARE SIGHED gustily. "It's hard to explain. About ninety percent of it isn't in words, or explainable in words. It's a mathematical concept that has reality.

"Wherefore I will now give you a typical pre-Sarn analogy, because neither you nor Grayth can get pictures from mathematics. It's a language, you know—as much a language as the one we normally speak, or the Sarn language. Some terms you can translate, and some can't be. For instance,  $x^2+y^2=c^2$  is mathematics language for 'circle.' I will give you analogies which I guarantee are not sound, and neatly conceal the truth. But I can't do any better.

"Dirac, a physicist of the pre-Sarn days, explained the positron as a hole in a continuum of electrons in negative energy states. Space, he said, was completely filled with electrons possessed of negative energies. It was full to the brim, and overflowed into the electrons we can detect—ordinary matter electrons.

"Shortly before the Sarn came, men were developing hints that there might be more to that. There was. Electrons in positive energy states, when vibrated, gave off radiation—light, heat, and so on. If you use energy concentrated enough, you can vibrate electrons in negative energy states. You might say they give off negative energy radiation. They produce photons of energy in negative energy states.

"As I said, it's an analogy that I can't honestly describe, but the effect is radiated negative energy. Radiant cold or radiant darkness or radiant lack-of-X-rays—whatever you want.

"Energy being conserved, of course, the result is that the source of that radiation, instead of consuming energy, gives it off. My pack does not radiate negative energy; it sets up a condition in the air about me that makes the air atoms radiate negative energy.

"The atomic flame the Mother turned on me satisfied, to some extent, the ravening demand for energy that negative energy setup caused. The force that makes the air atoms radiate in that

way makes them unstable—sort of splits them into two parts, two half-forned atoms of matter. In that state, neither half is real, but each has a terrible demand for sufficient mass—in the form of energy—to raise it to reality. In that median state, matter is interpenetrable. We walk through steel doors and stone floors, for instance. It will hang on that unstable point of half-and-half momentarily, before re-forming to matter. It's as dependable as a rattlesnake or a 'tame' tiger. While we're interpenetrating, it may fall off that delicate balance and consume our mass-energy in re-forming. When Sarn Guards send atomic flames after us, the unstable matter greedily drinks in the energy, and starts definitely toward re-forming with the air of that energy. If left alone, one half of the semiatoms absorb the other half, and it's normal again. In the meantime, it's black. And cold—like the Mother's Hall of Judgment right now.

"When the Mother's beams were tearing at me, the energy was actively making extra atoms of air. It didn't make any difference what kind of beam she used—the energy was consumed. Her atomic flame had lots of power—and made a lot of air. Her curious atom-disruption beam didn't carry much energy, but the particular form of the beam was most deadly. The form passed through my shield quite unchanged, theoretically. But the energy had been removed from it.

"Naturally, the Mother's physicists are badly puzzled now by a completely unanimous report of 'nothing' on the part of their instruments. None of them, of course, read below absolute zero. That shield has a temperature of  $-55,000^\circ$ . Absolute—or thereabouts.

"I could wipe out the Sarn very readily. But"—Ware shrugged his shoulders—"they'd wipe out all humans while I was at it."

"What do you need?"

"An hour," Ware sighed. "One hour—in the Sarn workshops. A few pounds of molybdenum, some wire-drawing apparatus, a few ounces of scandium and special glass-blowing machinery. Then I'd have a duplicate of this toy of mine that would protect this whole city for fifty miles about."

"In other words," said Grayth, smiling slightly, "if you could drive the Sarn out, you could drive them away."

"Precisely," acknowledged Ware. "Which is comforting, if useless."

DEYA RUBBED her left arm with her right hand thoughtfully, and turned sideways to the heater. "How far," she asked thoughtfully, "will your present apparatus reach?"

"That, too, is helpful." Ware grinned. "Just about far enough to blanket completely the Sarn City. I could protect that against any attack. But not, not by any means, the Human City."

"That might help, though." Deya nodded. "I have something in mind. My dress is dry, if somewhat crumpled. Could you get us something to eat, Ware? My chill has left me hungry."

"What's your thought?" asked Ware eagerly, half annoyed. The telepaths did not carry thoughts the wearer wished to conceal.

"I . . . I'd rather talk with Grayth first." Deya shook her head slowly. "I may be wrong."

Resignedly, Ware went up the crude stairway, up to the kitchen of his cottage one hundred and fifty feet above. Deya looked as Grayth as each in turn pulled off the telepath.

Deya pulled on her dress, smoothing the still slightly damp crinkles down. "How is Simons, Grayth?"

Grayth looked at her in slight puzzlement, his shirt half on. "Hopeless, as you know—but why do you ask now? He could not help us, anyway."

Deya's lips set in a slight, tight smile, her eyes bright and thoughtful. "I'm

not so sure, Grayth. Not . . . so . . . sure. Ware has said that anything that he can run through an amplifier can be recorded, hasn't he? And if it can be recorded, it could be rebroadcast on a different wavelength, perhaps—"

Grayth started, went rigid. "By Aesir and all the gods of Earth! Deya! What fantastic idea have you now? That man is mad, horribly, loathsomely mad—"

"Negative energy," said Deya shortly, deft fingers arranging her hair. "If we could make the Sarn give up without fighting—in despair and hopelessness—And there are energies other than those purely physical ones that the Sarn are so thoroughly equipped to resist."

Grayth stood silent for a moment, his swift-working mind forgetting for the moment the task of driving his tired body. "You've talked with Dr. Wesson?" he asked intently.

Deya nodded slowly, "Yes—just this morning," then thought a moment before going on. "Or rather yesterday. It will be dawn in about three hours, if the storm has stopped. We should bring him here before then. You see what I have in mind?"

"Yes! I'll have Carron—"

Ware came down the steps, slowly, bearing two trays with bread and cheese and cold meat, some cups, cream and coffee. "If you will use those beakers for the water, the laboratory hot plates for a stove, Deya, I'd prefer your coffee to mine."

"Ware," asked Grayth tensely, "can you record a thought—a telepath thought?"

Ware stopped, brows suddenly furrowed. "Record it? Why? I've never tried—it's easier to think it again."

"Could it be done?"

"Hm-m-m . . . yes. I think so."

"How long to make the apparatus?" Grayth asked anxiously.

Ware hesitated. Shrugged. "A few

hours. I can make that. Telepath apparatus, because of its very nature, has to be tiny. A few grains of the hard-to-get elements go a long way when the whole apparatus is less than a cubic millimeter in volume. But it takes time. A recorder and reproducer—say, two days, once I get the design. I think . . . yes, I know I can do it."

Grayth swept the telepath back to his head. Rapidly his thoughts drove out. — "Carron—Carron—"

"Yes?" Sleepily Carron responded to the call.

"It's three hours to dawn. Carron—this must be done before the first people stir. Get Ohrman, the instrument maker, to Ware's at once. There are telepaths to be made. Get Dr. Wesson and tell him to call at Ware's. Then rouse one of the other men to receive and transmit my orders and get some sleep yourself.

"Now, Ware, draw out the plans for the parts you'll need for that apparatus, so Ohrman can start while you get some sleep. Oh . . . you can, I assume, make some translator arrangement that will twist human thought to Sarn telepath levels?"

"Eh? Human to Sarn levels—I don't know about that. I've been working on that problem on and off for weeks."

"Good—it'll be on, and no off, now. If you can do that, Ware, we win Earth again!"

## IX.

THE THING was incredibly tiny. It lay in Ware's palm, two small, inclosed reels connected by a bridge of bulging metal, the size, perhaps of a half peanut, between two slices of inch-thick steel rod. But the workmanship was wonderfully fine.

"This is only the reproducer," Ware sighed. His eyes were red and weary. "The recorder is there. You said that needn't be portable. And it records,

as you wanted, in Sarn-type bands from the human thoughts, on a silver ribbon. The ribbon is endless, and repeats as long as this little spring is wound.

"Now, may I ask what you want of it? I've concentrated so on this that no question could enter my mind, I think. How is recorded thought to dislodge the Sarn? By repeating, 'Go away—go away,' endlessly? Telepathic commands have no more force than words, you know."

"Not if they are resisted," Deya acknowledged. "But they can enter below conscious strength level. Do you want to see who—why—"

The stone above moved. Grayth and Deya and Ware looked up. Only the heavily sleeping, exhausted Ohrman remained unconscious of the intruder.

"Down, Simons," said Dr. Wesson's voice. There was a gentle urgency in it, a pitying yet firm tenderness. A pair of feet appeared, slowly, wearily, with an air of terrible, unending exhaustion—tired beyond all rest, misery and hopelessness subtly expressed in the dull, shambling descent of those heavy feet.

Loosely, miserably they came down the long flight, their mechanical, rhythmic drumming a muffled beat of defeat. The man came into view. His figure was lax, powerfully muscled arms and shoulders bent under a soul-deadening weight of overwhelming despair. Down—down—

"Down, Simons." The doctor's voice was weary with a queer despair caught somehow from that doom-weighted figure.

Ware turned slowly to look at Deya, at Grayth. "Who is he—Simons?"

THEY DID NOT answer, and he turned back to look at the figure that stood unmoving now beneath the powerful lights of this buried laboratory. His face was pale and lined, powerful with the strength drained from it, set



in a dead mask of uncaring despair. His eyes were black, black pits that looked without hope, or hope of hope, into the keen gray eyes of Aesir.

Ware felt something within him chill under the gaze of those eyes that no longer cared or hoped. The soul beyond them was not dead and longed for death. The lights of the bright room seemed cold and drear. Fatigue and hopelessness of the endless struggle against the overwhelming Sarn surged up in Ware, hopelessness and despair so deep he did not mind that the cause was lost before—

He tore his eyes away. "Deya—in the name of the gods, what—who—what is this thing!" he gasped.

"That is negative energy, Ware. That is the negative energy of the mind, the blackness of Aesir applied to all hope, all ambition. He is mad; he is a maniac depressive. He has no hope, no thought of escape from that negative hell of despair that is beyond despair. He is mad, for no sane mind could conceive that awful blackness, the hopelessness that is a positive, devouring force that infests his being.

"If ever his mind should start to mend, he will become a suicidal maniac, driven to kill himself in any way he can, at any horrible expense. He cannot think of that escape now. That is struggle, that is in itself a hope—and he has none. To conceive of death as an escape is to hope, to believe that something better can be.

"That is beyond him now, for hope—struggle—effort to escape—all involve a will that mind has lost.

"He is mad, Ware, because no mind can hold the terrible despair his thoughts now know and remain sane.

"Record his thoughts. Record them there on that silver ribbon. Record that hopelessness that knows no resistance, no will to struggle. Record it, and broadcast that through the Sarn City!"

## X.

THE SARN-MOTHER sat motionless at the high window of her tower, dull eyes looking out over the Gardens of the Sarn. Rich cloaks and heavy blankets wrapped her—useless things. The cold seeped through to her bones and drank her warmth. The great chamber, windowed on every side, was darkened by a heavy gloom, chilled by a cold that had grown slowly through the hours and the days she had sat here, almost unmoving. The bleak, cold stone of the walls was damp with a cold sweat of moisture. Great heaters in the walls ran at red heat and the dark air drank their warmth. Magnificent atom-flame lamps rustled softly in the high ceiling; their faint, silken whisper mumbled meaningless in her ears, and their strong light had lost its sparkle. Some subtle change in the air made it seem gray and very cold.

The sun did not shine here. A cold, steady rain beat down on the Gardens below, ran endlessly over the clear windowpanes, stirring under vague, listless winds. The sun did not shine here. Through the fog of slowly dripping rain, beyond the limits of her gardens, the sun shone. It was brilliant there, she knew, a bright, hot sun sparkling in the bright clean air. It was June out there. The year was dead here, dead in a creeping, growing chill that burdened the land. The creeping, growing chill of—

That hellish thing of blackness. Almost, she felt angered at it, squatting there, dejected, black, unutterably woe-ful in the center of her Gardens. Or what had been her Gardens. It was a ravaged place now, plowed and harrowed by howling beams of atomic death, a shrieking incandescent effort to move that crouched thing of blackness. It had meant only the destruction of one slight spot of beauty in a dreary, cold world.

But that meant little, for there was

no beauty now, or ever would be again. Only the chill that stole the heat from the air, the walls, her tired old body and the subtle darkness that cut through the brilliance of the atom flames and left light without sparkle, colors that all tinged gray.

A finger stirred listlessly and pressed a control. No, it was over. Full heat. She had known that; what sense to try again what she had tried a thousand times before during these endless, sleepless days that changed only from one shade of gray to a deeper black.

Dull eyes looked at the sweating walls. Cold, stone walls. When had

then to learn that secret.

Time she had now; four thousand wheeling years. But now she could not learn; it eluded her dulled mind, and the weakened minds of the decadent race.

As Aesir eluded her, and squatted miserable in the midst of misery his works had brought.

She stirred. The cold worked through. Hot food, hot drinks—they warmed a moment, then added dead, cold mass to the chill within her. A deadness that, she knew now, had been within her before this glooming chill had made her more aware. Her Sarn



it ever been that she had ordered stone? Warm marbles of rose and green. Warm? The rose of dying day before night's chill. The green of endless arctic ice. It mocked her and drove its chill to her age-old body.

Age-old. Unending years that had wheeled and rolled while she waited, useless. Waited for the coming of her people, or when she might again seek in space. Useless years of fruitless attempts to learn that one, lost secret of speed bettering light's swift flight. Lost—lost with the ten trained Sarn that died those four thousand years gone in the blasting of this city once called New York. Too much else she'd had to do

were weak; the soft product of an easy world, too sanely organized to require of them sharp, sharpening competition in endeavor.

And she was old. Immortality she had, and everlasting youth of tissue. But the mind grew old and dull, the courses of its thoughts narrowed and chilled with years and millenniums that passed. She was never to recall that exact age—but what matter? A stupid thing. What mattered that she thought of it or not; the years had passed, they'd graved their mark and narrowing on her. And on her race.

They had weakened. Humankind had strengthened, grown with the years that

sapped the Sarn. Now, in her Gardens, that hunched figure of dejection squatted, chilling all her city, defying the minds of all the Sarn. It had been a matter of time, inevitable as the fated motion of the planets. And the time had come. The humans were the stronger.

THE DOOR behind her opened slowly, but her brooding eyes remained fixed on the far wall till the intruder moved before her gaze. Barken Thil. Once, the Mother had thought her brilliant, hoped this physicist might find the forgotten secret of the speed drive. Now her eight-foot figure was shrunken, dimmed by the fog and gloom that curled the air about them. "Yes?" The Mother spoke wearily.

"Nothing." The physicist shook her head. "It's useless, Mother of the Sarn. The blackness is there. No screen, no substance shuts it off. It registers no more than the cold we feel on our instruments; they tell us only what we know, that the air transmits less light, less heat. It is absorbed somehow, and yet does not warm thereby. A vacuum transmits energy as before—but we cannot live in vacua.

"Thard Nilo has gone mad. She sits on her stool and stares at the wall, saying: 'The sun is warm . . . the sun is bright. The sun is warm . . . the sun is bright!' She will not move save when we lead her. She does not resist—but she does not act."

"The sun—is warm," the Mother said softly. "The sun—is bright. The sun—never shines here now. But the sun is bright and hot and the air is clean and dry in Bish-Waln."

The tired eyes looked up slowly toward the lax figure of the physicist. "I . . . I think I will visit. Bish-Waln. Where the sun is hot and bright and the air—

"I have never been there; never in all the time Earth became ours, four

thousand years ago, have I left Sarn City. I have never seen Targlan of the ever-blue skies and the ever-white mountains. I have never seen Bish-Waln in the golden sands . . . the hot sands.

"I think that now, before humanity rises finally, I should like to see it. I think . . . yes, perhaps I will go."

TWO HOURS later, she roused herself to give orders, vaguely, and hours later to enter her ship. The chill leaked out of metal and crystal as from the cold, green stone. The stared blankly through the rain-washed windows as the gloom-crowned Gardens and the Sarn City dropped behind. One more ship rose slowly, listlessly behind her. Vaguely, she wondered that so few Sarn had been still there that these two ships could carry all.

For the first time in four thousand years she was leaving her city. For the first time in four thousand years no Sarn remained in Sarn City.

The clouds and gloom were suddenly below, a dull grayness that heaved and writhed like a living dome over Sarn City. June sunlight angled from the setting redness in the west across the Human City stirring vaguely there below. A warmth she had not known in six unending days shot through her ancient body, and a blissfulness of sleep lapped her as the ship accelerated strongly, confidently, toward the sparkling waters beyond, toward Bish-Waln, bright and hot in the golden Sahara.

Her eyes closed, and she did not see through the dissolving clouds to the black figure that slowly rose erect, nor to the ordered division of the Legion of Peace that marched toward the blank, silent windows of the Sarn Palace. Behind them came a loose group of work-clad men to disperse among the dead, lightless shops of this, the city that had marked the landing of the Sarn.

# An Electric Battery 2,000 Years Ago

By WILLY LEY

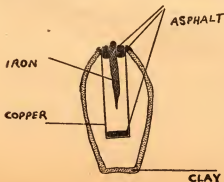
**A** DISCUSSION of electric batteries anteceding Alessandro Volta's first experiments of the year 1800 or even Luigi Galvani's first publication of 1791, not by a few years but by many centuries, would have seemed wholly absurd only ten years ago. But there is now reason to believe that electric batteries were actually known and in use long before the time of Volta and Galvani. It is true that those that built and used these batteries at about the time of Christ—or even earlier—had, in all probability, no conception either of chemical reactions or of electric currents as we understand these terms. To them it was only an empirical knowledge, that they could expect certain results when doing certain things. It might be added that the knowledge of such results was confined to narrow boundaries, the center of which was the famous old city of Bagdad.

Dr. Wilhelm Koenig of the Iraq Museum in Bagdad reported recently that a peculiar instrument was unearthed by an expedition of his museum in the summer of 1936. The find was made

at Khujut Rabu'a, not far to the southeast of Bagdad, near the railway leading to Kirkuk. It consisted of a vase made of clay, about 14 centimeters high and with its largest diameter 8 centimeters. The circular opening at the top of the vase had a diameter of 33 millimeters. Inside of this vase a cylinder made of sheet copper of high purity was found—the cylinder being 10 centimeters high and having a diameter of about 26 millimeters, almost exactly 1 inch.

The lower end of the copper cylinder was covered with a piece of sheet copper, the same thickness and quality as the cylinder itself. The inner surface of this round copper sheet—the one that formed the inner bottom of the hollow cylinder—was covered with a layer of asphalt, 3 millimeters in thickness. A thick, heavy plug of the same material was forced into the upper end of the cylinder. The center of the plug was formed by a solid piece of iron—now 75 millimeters long and originally a centimeter or so in diameter. The upper part of the iron rod shows that it was at first round and, while the lower end has partly corroded away so that the rod is pointed now at the lower end, it might be safely assumed that in the beginning it was of uniform thickness.

An assembly of this kind cannot very well have any other purpose than that of generating a weak electric current. If one remembers that it was found among undisturbed relics of the Parthian Kingdom—which existed from 250 B.C.-224 A.D.—one naturally feels very reluctant to accept such an ex-



planation, but there is really no alternative. The value of this discovery increases when one knows that four similar clay vases were found near Tel'Omar or Seleukia—three of them containing copper cylinders similar to the one found at Khujut Rabu'a. The Seleukia finds were, apparently, less well preserved—there are no iron rods in evidence any more. But close to those four vases pieces of thinner iron and copper rods were found which might be assumed to have been used as conductive wires.

Similar "batteries" were also found in the vicinity of Bagdad in the ruins of a somewhat younger period. An expedition headed by Professor Dr. E. Kühnel, who is now director of the *Staatliches Museum* in Berlin, discovered very similar vases, with copper and iron parts, at Ktesiphon—not far from Bagdad. These finds date from the time when the dynasty of the Sassanides ruled Persia and the neighboring countries—224 A.D.-651 A.D.

While the probable date of the inven-

tion is entirely open to conjecture, it seems likely that it was made in or near Bagdad, since all known finds were made in the vicinity of this city. It must be assumed, of course, that the subjects of the Sassanides had some use for them, and Dr. Koenig, the discoverer of the best preserved of all these vases, suggests that this use might still be in evidence in Bagdad itself. He found that the silversmiths of Bagdad use a primitive method of electrogilding their wares. The origin of their method cannot be ascertained and seems to date back a number of years. Since galvanic batteries of the type found would generate a sufficiently powerful current for electrogilding small articles fashioned of silver, it might very well be that the origin of the method has to be sought in antiquity.

It is, of course, strange that nothing of this remarkable feat was related by ancient authors. But, if it is assumed that those batteries and their use was guarded as a trade secret, it is possible that it did not become known until now.

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### ELECTRIC BATTERIES—FOUR THOUSAND YEARS AGO!

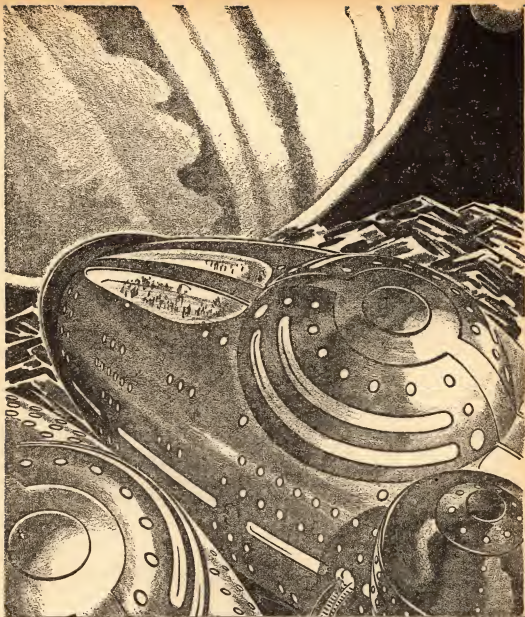
The persistence of the belief in the "Philosopher's Stone" that could transmute one element into another may well have basis in a fact—though not the fact the alchemist believed it to be. There was, in effect, some use of electroplating even earlier than that mentioned by Willy Ley in the above article, though far cruder.

Museums have, recently, been using a replating process to restore badly corroded copper and bronze vessels found in ancient Egyptian tombs, and in similar circumstances. The original idea was that the verdigris could, by slow electrodecomposition, be urged back into the metallic state, and the metal atoms gently replaced in their original positions, showing the inscriptions previously illegible.

Many of the art objects so treated returned to near their original state—and some of them then showed a nice, white surface of silvery metal as well! Copper and bronze vessels had been plated with a metal which turned out to be antimony.

Investigation indicated that the "Philosopher's Stone" had fallen from the sky—in the form of an iron meteorite. Priests, perhaps, working with these miraculous stones from the skies, may have discovered that a mixture of kohl, an antimony salt used as a black cosmetic material; natron, a natural sodium carbonate solution found in Egypt; and salt, in water, aided the stones to work miracles. Specifically, if a copper or bronze vessel is dipped in the solution and touched with iron, a slow plating of "silver" appears. Presto—the magic stone has changed copper to silver!





# **FOLLOW THE BOUNCING BALL**

A JOSH MCNAB YARN BY  
**ARTHUR J. BURKS**

## FOLLOW THE BOUNCING BALL

*Josh McNab drives home a point to Skipper Parsons' hard head—with the aid of a billiard ball!*

**S**AVAGE thoughts seethed through the brain of Engineer Josh McNab. None of them was pleasant. He was about fed up with his current duties. Fancy the likes of potbellied old Caperton, of the Caperton Lines, keeping the *Arachne*, first of the Spider Fleet, on freight runs! During the last few years she'd touched at every port in the Universe practically, to dump junk of one kind or another, and take on junk of some other kind for somewhere else. There was no excitement in it. Josh was getting on in years, but excitement was still the breath of his nostrils. It got in his eyes like battle in the eyes of a war horse. Only right now it didn't do him any good. For the status of the *Arachne* was lowering with every trip, and before anybody realized it, Caperton would send her to the boneyard. Then where would Josh McNab be? He hated to think. He'd imagined himself as a retired chief engineer, rotting in some Earth boarding-house the rest of his days, or riding to Mars or Venus or somewhere on "X" tickets—you were always laying over on those tickets, because you didn't pay for them, and sometimes the passenger lists on the crack liners were filled to bulging—and being bored stiff.

He couldn't possibly be bored more than he was on this current Earth-Jupiter run, but at least it was something. It was still duty. If he lost it, he, like the *Arachne*, would be turned out to grass. Skipper Parsons, too, obviously, else they'd long since have shifted him to the command of one of the crack liners. Caperton knew that Parsons wasn't up to snuff, to compare with the young squirts who skippered the streamlined jobs. Parsons wouldn't

be retired for age, but would have a stay-at-home job that wouldn't humiliate him too much. Caperton would kick him upstairs to be rid of him.

"An' gude foor 'im, th' noo," said Josh McNab to himself. "Th' fat-noodled bag o' wind!"

There had ways been a feud between McNab and the skipper. McNab didn't think Parsons had sense enough to come in out of the rain, even though he could take the *Arachne* places and bring her back. McNab had never forgiven him for the early days—the *Arachne* had been first then and had carried passengers—when Parsons had strutted before the beautiful lady passengers like a peacock that'd swallowed a watermelon.

"An' they didn't need t' be so bootiful, eether!" exploded McNab. "Jist so lang as they werre wumman!"

Yes, and Parsons had never missed a chance to poke fun at McNab's brogue in front of women passengers. Parsons had imitated him—childish amusement, at that—until the women had laughed and McNab had got red behind his hairy-tufted ears. Then, better and better interplanetary passenger ships had been built, and the *Arachne* had become dated, obsolete, and hadn't been retired completely, solely because old Caperton was the kind of man who squeezed the very last drop out of the driest lemon. Not, you understand, that the *Arachne* was a lemon. She was a peach, even; she was still the apple of Josh McNab's eye, but she was plainly never going to get a chance to prove it.

PARSONS was going sour on it, too—which didn't help him with Caperton, who, like as not, had plenty of spies

among the grimy crew he now shamed the *Arachne* with. He'd bet they took tales to Caperton about Parsons. There must be some reason why Parsons didn't get a faster, newer ship. McNab could think of plenty of good, sound seasons, but he also knew nobody but himself was aware of Parsons being a kind of stuffed shirt. McNab, faithful to his superior, had covered him up plenty of times, and Parsons had thanked him with a figurative kick in the pants every time. Yet, Parsons was skipper, and McNab, chief engineer.

"An' noo," he went on, "*this!*"

This was a billiard table, tucked away in what had once been one of the finest staterooms on the *Arachne*. Parsons had brought the thing aboard in the dead of night, a year before, as though ashamed of anybody seeing him. McNab asked him testily if he were going to kill the men who had done the heavy work, by bumping them off in pirate fashion.

"Now, McNab," Parsons had said, "don't start to ride me. Remember, I'm still the master of the *Arachne*, and bored to tears. In my youth I wanted to be a billiard champion. With our runs as dull as dishwater, and nothing ever going wrong, I might as well indulge my whim."

"Ye nicht, sirr," said McNab, grunting, "boot if auld Caperton hears aboot 't, that ye're usin' space that nicht be rrrrooom foor condy foor Jupiterean lads an' lassies, he'll ne'er forgive ye!"

"You'll not be squealing, McNab?"

"Have I, iver? An' there have bin mony's th' time auld Josh c'u'd o' talked a-plenty!"

"Forget it, McNab, forget it! I'm just a little edgy with boredom, that's all. Let me have my whim. Learn how to play billiards yourself, so as to give me some competition—"

Old Josh had almost thrown fits up

and down the main line helix shaft of the *Arachne*. A chief engineer playing billiards with the skipper to keep him from being bored! Parsons would want him to hold hands with him next! Parsons, angry and feeling sheepish—though he was never the kind to admit it—actually *ordered* McNab to play the game with him the first time. Whereupon old Josh had been enthralled by it. His mind was a mechanical one. There was a fine sense of mechanics in making a good billiard shot. McNab hated to admit it, but he liked the game from the start—wondered why he'd never gone in for it himself. When he said as much, Parsons angered him by saying:

"You're Scotch, that's the reason! Playing billiards costs money."

It was true, though McNab had never thought of it that way. Now, of course, it cost nothing. McNab, though never really the kind of old dog to learn new tricks, even got in the habit of practicing when he could get away from his precious motor, and the captain was sleeping. He was determined to become a fine player. An old man couldn't do it, he'd been told, but he knew his eyes were keen, his nerves the best. They'd both stood him in good stead for many years. However, when he found that he was improving day by day, a queer hunch came to him not to let Parsons know. Parsons, who always won, jeered at McNab continuously. The old man would never learn. McNab got red, but held his peace. He could, right now, beat the daylights out of the skipper, but he couldn't forget what Parsons had said about his Scotch penuriousness. Come the right day, the right moment, he'd bet Parsons everything he possessed, and take the skipper's shirt actually, if he could get Parsons to go the whole way.

Did Parsons know how good he had become?

BUT WHERE was all the speculation getting him? He was standing on the landing stage of the *Arachne*, which was being loaded for Jupiter, and wishing that Parsons would come so they could get away—ride out to some new gravitic-force field, really get going. There was something about billiards; a kind of hunch was growing in Josh McNab to the effect that he hadn't started playing, and made himself so good, just for an escape from boredom. The billiard game reminded him of something—if he could only remember what it was!

Again he put billiards out of his mind. They were just three balls that you shot around with a cue, that was all. How could they possibly be important, when his real job was to see the *Arachne* safely to Jupiter, through all her satellites?

That was it! Somehow, the billiard balls reminded him of their regular Earth-Jupiter run. Maybe he'd get an answer to something, if he kept his agile brain going. He wanted one answer to just one thing: he wanted to prove that while the *Arachne* was a slow old tub, she was still the safest sky-boat in all the Caperton fleet—never had an accident, was as reliable as a golden-wedding wife—and should not be junked for years to come, but given passengers to carry instead of gobs and slathers of silly freight. Of course, young folks wouldn't ride on her, but if staid old people, who were afraid of the streamlined jobs, could be persuaded that the *Arachne* was just their speed, why, old Caperton would have a new set of customers! But how prove anything?

Nobody gave the *Arachne* a thought. She never did anything outstanding, never got mentioned in orders or dispatches, never made any spectacular interstellar rescues or anything of the sort, never got mentioned in the news of the

worlds. She was an old stick-in-the-mud, but Josh McNab knew she rated something better, finer, if for no other reason than that she was the *Arachne*, first of the Spider Fleet—founder of the Caperton fortune—to go to astronomical figures. But why he kept harking back to billiards—

Skipper Lee Parsons came onto the landing stage.

"Everything set, McNab?" he barked.

"Aye, sir! Even th' skipper's temper, sirr!"

Parsons almost exploded, but held his peace. McNab could make him explode any time he wanted. As simple as touching a hot cigar to a toy balloon. McNab knew how to make the right touch. He always liked to prod the skipper. He'd miss it if he were ever retired and never got the chance again. But he never went to the exploding point when the *Arachne* was getting set to leave or warping into a landing stage.

"Lay off me tonight, McNab" said Parsons. "I'm in no mood for your near-insubordination! Why I never logged you for it, I don't know."

"Sirr, I ken th' reason. Ye canna find anither engineerrrr like Josh McNab!"

"All right! All right! Let's get going! I'll signal the helicopter tugs, if you're ready, and we'll be on our way. Maybe I have been a bit short with you, McNab. A game of billiards, once we're out of the Earth's atmosphere, and I'll feel better."

Josh stared at his skipper. It wasn't in the man to be gracious. He was pretending to be, now, only because he wanted a game, and Josh might well refuse to give him one. He could always order him, of course, even though billiards were scarcely in the line of duty. But when you made Josh do things he didn't want to, there was no telling what dire things might result. He had a way of hitting back that could

never be called mutiny or insubordination.

"Is summat wrong, skipper?" asked McNab.

"Yes, damn it, yes! I've just come from a confab with Caperton. He practically told me that the *Arachne* would go out of commission by the end of next year! That means retirement for you and a desk job for me. I argued with him—"

Parsons, of course, would! You never argued with Caperton, if you had any sense; you outwitted him! He was as stubborn as the extinct mule was said to have been.

"I only made him more determined than ever. Come on, let's get under way, before he puts her out of commission right now!"

SHORTLY thereafter the helicopter tugs were shaking the *Arachne* out of her landing stage. McNab, intent on his job, was down in the engine room at the very bottom of the egg-shaped mighty ship—or rather it had once been mighty, before the real speedy monsters of the star lanes had been built. Come what may, Josh McNab was engineer first, man afterward. Taking off, he made sure that everything ran perfectly. That miracle of a motor, capable of revving up to thirty-five thousand! The rotor shaft that ran the length of the ship. The main line helix—a mystery which Josh had never been able to explain to himself and kept him believing in God the Unknowable—wound around the rotor shaft, by means of which the *Arachne*, "like a rat along a rafter, a spider along her web," sped in any direction she chose—along gravitic lines of force that were the invisible webs connecting all celestial bodies. If she were en route to Jupiter, she got onto the Jupiter force lines, fed them into one end of her, through the main line helix, and out the other.

She followed those lines like someone crawling hand over hand up a rope, but at plenty of speed—

Josh grunted his disgust. Speed? Hell! Beside the slowest of the great streamlined jobs she moved as though standing still! Just the same, she always got there. Josh used to amuse himself, when he felt the need for a good stiff drink, by standing before a port and imagining he could see all those lines of gravitic force that connected the stellar and planetary bodies in a maze beyond all counting, all conception—yet susceptible of being followed as a grand dame followed a single thread into the heart of a tangled ball of yarn. Knowing, one could follow the right line to anywhere. Parsons knew. McNab knew, but didn't feel sure he knew. He'd always been a subordinate—

Well on their way, with everything going just right, with the main line helix whispering its assurance of safety and efficiency, with the great girders taking up the strain and "talking" throughout the *Arachne*—like rafters in an old house at night—Parsons and McNab gathered about the billiard table, upon which a cluster of lights showered a brilliant glow.

"Dinna ye ken the answerrr, skipper?" said McNab, chalking his cue.

"If I did, do you suppose I would be worrying? No, there's no answer. Or rather, there is: Caperton has given it. McNab, we're through!"

"Josh McNab willna accept that, sirr! Th' *Arrachnahh* willna gang to th' bone yarrd if auld Josh—"

He closed his lips tightly. Not a good idea to let Parsons know he was trying to find an answer to their problem. Parsons always told him that he wasn't paid to think, that he had nothing to think with, anyhow, and that Parsons himself was the man with the brains. He wouldn't go in for a rebuff now, but

he could drop a hint or two!

"Yon laddies on' th' streamlinerrrs, sirr! Hoo did they get their jobs, sirrr? Dinna ye ken, sirr, that they be smart lads? They ken th' value o' publeecity!"

"Publicity, my God!" said Parsons. "If you've got any idea of putting the *Arachne* into the limelight, get it out of your head. It would be the one thing to make Caperton snatch her to the junk heap instantly. It isn't publicity we need, but an utter lack of it! If we can sort of sneak along on our job, without fuss and feathers, without attracting attention, Caperton may forget about us . . . and we can hang on that much longer!"

McNAB, making a nice run at billiards, but missing before Parsons could notice how nice it was, felt a little shiver. Parsons talked as though he were afraid! McNab knew many things to be wrong with Parsons, but he had never seriously questioned his courage. Moreover, he was afraid for his job! Keep out of sight of the boss, and maybe he wouldn't remember you, him having so many employees! What a comedown for the strutting Parsons!

McNab was all-fired glad he hadn't chosen tonight to bet with the skipper, for if he had, and had won—and he wouldn't have bet without knowing he'd win—Parsons would probably have committed suicide. That's the state he was in.

As usual, Parsons won. McNab didn't talk for hours, because that brain of his was going top speed. Jupiter and her satellites—three ivory balls on the table. There was some connection, some hunch or other, between the two widely different things. But *were* they so different? McNab knew the vastness of interstellar space better than he knew the actual ingredients of a billiard ball. Might not there be worlds, galaxies, universes, inside a billiard ball? Was that

what was nagging at him? No, not that. Billiard balls, Jupiter and her satellites. Something there certainly, nagging at the brain of McNab, knocking at the door of his mind, begging to be admitted.

But there was no answer to anything for four days, when the interplanetary S O S went flashing forth to all ships of the Caperton fleets, to all ships of all fleets, to all the inhabited planets:

*"Catastrophe strikes Ganymede! Mysterious epidemic slays most of inhabitants. Two ships of the Caperton lines are stranded on Ganymede, loaded with survivors! S O S! S O S!"*

Parsons and McNab stared at each other aghast. There were a few colonists on Ganymede, both knew. The *Arachne* had taken them there, years before. They'd made a go of it somehow, in a moon that was practically hopeless from any point of view. They'd even established a thriving civilization where none had really been possible. And Caperton had made Ganymede a port of call for his ships.

"Passenger ships will have to go to the nearest planets and unload their passengers before they can help," said Parsons, musingly. "They won't dare endanger them. It will take time. There doesn't seem to be much hope. I wonder why those two Caperton ships are stranded."

McNab's eyes were shining.

"Dinna ye ken that no Caperton ship has engineerrrs like Josh McNab, no skipper like Parsons? Skipperrr, oor answer! Weigh for Ganymede! If we make it, would e'en Caperton dare retirre us?"

Parsons stared at McNab, his face slowly going white. Then he shook his head.

"No. Even the slowest of the streamlined jobs can put in to the nearest port, unload and reach Ganymede before we can reach it direct! There's nothing we



cen do! Besides, I wouldn't try without orders from Caperton. Of course, just to let him know I'm on the job, I'll ask him!"

Ten minutes later Parsons shook his head as he resumed the game they had been playing when the catastrophe had happened. "He told me not to get too big for my shoes, McNab! He said some nasty things about the *Arachne*—"

"Thin go in spite o' the auld curmudgeon! Remimber oor trip to Pluto, when we beat th' best? We can oot-smart 'em again, skipper—"

"No!" said Parsons, a note of finality in his voice. "And don't get any ideas. I know what you're thinking, that here's our chance to cover ourselves with glory, make the *Arachne* universally famous, and heroes of ourselves! It can't be done! We're a tub, and we might as well admit it! We hold to our course for Jupiter, and no tricks, McNab!"

McNAB MADE his face blank, for suddenly he had the answer. He knew what had been running through his mind all this time. Those billiard balls had started it. He'd only been waiting for a chance, a break. It had to come sometime in a universe where so many things happened all the time. Sooner or later it would come when they were close enough—

And when could they ever be closer than now, when they were already en route to Jupiter, of which Ganymede was a brilliant satellite? McNab, getting excited over thoughts that were coming to him, discovered that Parsons had gone still, quiet. Then McNab realized that he had beaten Parsons at billiards for the first time! He'd sunk him without a trace, because he'd been thinking of something else and playing, automatically, at his best. Parsons was staring at him. McNab instantly tried to escape any possible accusations by saying:

"Ye're noo on yer game, th' nicht, skipperrrr!"

"McNab, that was a brilliant run, and I *am* on my game! Just why have you been hiding from me the fact that you could trounce me whenever you wanted to?"

"There goes my chance to take all his money," thought Josh.

But here was his chance to do what he wanted to do—send the *Arachne* to Ganymede in spite of Parsons, and without actually disobeying orders.

"Just how good you actually are, McNab," said Parsons grimly, "I intend to find out. I'll bet you a thousand dollars on the next game!"

"Ye ken I dinna bet!"

"Not even on a sure thing, McNab?" asked Parsons.

"Forget it, sirr. An' noo, aboot yon Gany-meedee—"

"You forget *that*, McNab! Let somebody else be a hero—"

But McNab didn't forget. He steered away from the skipper's challenge to bet, and went to his stateroom where he got out his charts and began to do some fast, skillful figuring. Jupiter, anyhow four big moons, Ganymede . . . Callisto . . . humph! A lot of pulling and hauling there, when it came to gravitic force. Orbits of the moons were edgewise to the Earth and the Sun. Humph, let's see, just where was Ganymede now, with reference to the Earth, Jupiter, and the location of the *Arachne*? How could the *Arachne* be maneuvered through the satellites, maintaining top speed all the time, brought into the strongest gravitic pull of Ganymede, revved up to the limit, and brought down to a landing stage on her? Not, of course, that it would happen this trip, on account of Caperton's orders.

Had Caperton actually told Parsons not to go to Ganymede? It didn't sound reasonable to Josh. Struck him that

Caperton would gladly have risked the *Arachne* to save two of his finest planetary liners. Had Parsons lied about it, because Parsons himself was afraid to go to Ganymede? Nonsense! For some reason Caperton *had* ordered Parsons not to make the rescue attempt. McNab thought he had it. If the *Arachne* covered herself with glory, she might make all potential passengers in the future regard the streamliners with doubts—as being *too* modern. Yes, there were two ways to look at it.

McNab grinned. The *Arachne*, by hook or by crook, was going to Ganymede. But how? McNab knew that, too. He went to the bridge where he knew he would find Parsons at this moment, and said calmly:

"Weel, sirr, since ye ken auld Josh is purty good, we'll aye play for th' thousan' dollars, sirr! Will ye coom?"

"Good. Have you given up the idea of going to Ganymede and making heroes of us?"

"Oh, aye, sirrr!" said McNab, with his fingers crossed behind him as he followed the skipper back to the "billiard salon."

"You'd like to bet all your money against my agreement to alter the course for Ganymede, wouldn't you, McNab?" said Parsons.

"Aye, sirrr!"

"Then you *are* sure of winning eh? In that case, why should I lose a thousand dollars? I know that if you play the way you did the last time, when you forgot to pull your punches, you'll beat me. Also, I see you've still got ideas about Ganymede!"

McNAB said nothing. The skipper and the chief engineer, finally agreeing to the thousand-dollar wager, settled down to play. Parsons had a good run, and McNab, watching him, decided that when his turn came he would prove something to the skipper in a fashion

he wouldn't be able to gainsay.

"Watch the noo, skipper," he said, chalking his cue. "Take note o' th' balls. Sorry I am that it isna pool, whur we'd have mair balls—"

McNab squinted over the end of the table, estimating distances for his first shot—and something else—

"Coom along there, *Arrachnahh!*" he said, as he cued the ball. It rolled softly up to the first white ball, kissed it lightly, moved ever so slowly on. "Dinna ye stop ere y've made Ganymede!" Parsons looked startled, as though he thought McNab had gone crazy. "It isna enough that ye're able t' hit Jupiter on th' nose—"

Parsons' eyes narrowed as he began to get what McNab was trying to do. Trying to get his goat, of course, and thus his thousand dollars; but more than that besides. He was, without actually disobeying orders, showing Skipper Parsons just how he could make Ganymede from his present location between Earth and Jupiter. McNab had named the three balls. The ball he was playing was the *Arachne*, the other was Jupiter, and the third was Ganymede. And McNab, by the proper and correct use of his cue—which represented, Parsons saw right away, "gravitic lines of force"—was giving the skipper a lesson in interplanetary navigation. Parsons whistled softly to himself. McNab was not just a good player; he was a remarkable one. For when all three balls had come to rest, their positions, with relation to one another, were the relative positions in space of Earth, Jupiter and Ganymede! And McNab's cue was the "lines of gravitic force." McNab had just shown Parsons how he could reach Ganymede by the shortest, fastest route—if he "played his shot" as McNab had just played his!

McNab, his face empty of expression, was as intent on his game as though he didn't even know what he was talking

about. He was coming as close to not letting his left hand know what his right was doing as was humanly possible.

Before making his next shot, McNab did an irritating, amateurish thing. He hadn't even done that when he'd started playing. It was strictly kid stuff. McNab began measuring his next shot with his cue, sighting along it from the cue ball to the next one, then from that to the next, picturizing his angles like any beginner—

"It's no use, McNab," said Parsons. "I'm no numskull, and I can see what you're so naïvely trying to show me. But it's no go. You'd better concentrate on your game, or you'll lose your thousand dollars!"

McNab seemed not to have heard. He seemed to be talking to himself.

"Hooever, since Jupiter is no here, an' Ganymede is no here but *here* . . . then th' *Arrachnahh*, following this set o' lines o' foorce instead o' *this* set o' lines o' foorce—" He cued his ball again, and when the three of them came to rest, Parsons snorted.

"Yes, and that's how Earth, Jupiter and Ganymede will lie tomorrow, when we come into Jupiter's strongest lines of force! I don't need a diagram. I know as well as you do. You could show me on a map, just as well as on a billiard table, and I'd still say no. With Earth, Jupiter and Ganymede—and the *Arachne*—in their present relative positions, we haven't got a chance of reaching Ganymede ahead of any of the passenger liners, even if I were fool enough to flatly disobey Caperton. And you'll notice, McNab, that you've got a lie now that's an impossible shot for you, without making a lot of cushions. Keep on playing like this and I'm as good as spending your thousand dollars!"

FOR SEVERAL minutes McNab measured, squinted down his cue, sighted

over the sides and ends of the table. Then he straightened, ran his cue through his fingers a few times.

"I ken how to make the shot, sirrr. I also ken how to reach Ganymede. An' it's th' same sort o' shot, sirrr! Baith seemple!"

"The answer is still no!"

"I'll bet ye anither thousand I make this one, sirrr!" said McNab.

"Done!" said Parsons. "It's an impossible lie for the likes of you and me!"

"Nay, sirrr. Watch closely, th' noo!" McNab sighted carefully. Parsons got interested in spite of himself, for the shot was a difficult one. McNab didn't cue it softly this time, like the kiss of a child; he smacked it. That Parsons, at that identical moment, happened to be bending over, sighting across the end of the table to watch McNab make the shot, was one of the things McNab had led up to. Not only had he had to maneuver the balls as he had; he'd had to maneuver Parsons, play him like a fish on a hook. Nor had he ever seen fit to mention to anybody just how nutty he really had become over billiards—nuttier even than he'd ever been about the *Arachne*. Nutty enough, in fact, to have sent away for a book on trick shots, a great number of which he had mastered. One of them fitted the present situation admirably.

As a matter of fact, he missed his shot—as far as billiards was concerned. The cue ball came to rest on the floor finally, but not until it had struck Skipper Parsons a terrific wallop between the eyes, slightly above them! McNab sighed with satisfaction. That's just where he had intended hitting Parsons! The best place to hit a man with a billiard ball if you wanted to floor him. The result in this instance was satisfactory. Parson went down.

McNab patted the cue. Then he knelt over the unconscious form of Parsons

and held a monologue. He knew, of course; he said to the cold skipper, that while he had been talking to Parsons in parables, using cue and billiard balls for symbols, Parsons had answered him in the same manner. He, McNab, had explained how to get the *Arachne* to Ganymede ahead of everything and everybody else. Parsons, if one were to believe McNab's monologue, had manifestly agreed—for hadn't he instantly grasped the significance of the lie of the balls? And hadn't he even agreed that the various "shots" were possible? Of course. Then that meant, didn't it, that if anything happened to the skipper, McNab was to see that the course was changed for Ganymede? And hadn't something just happened to the skipper? It was as simple as that.

McNab was an expert at estimating time and distance. Now he proved it by lifting the skipper's lids, feeling his pulse, and deciding that he would be unconscious long enough to suit McNab's purpose. This satisfactorily determined, McNab calmly saluted the skipper's supine form—he seldom saluted him at all—and said:

"Aye, sirr! Ganymede it is, an' richt proud ye'll be ye orderred th' change o' coourse!"

McNAB went up to the bridge and arranged for the change of course himself. By an odd, a very odd, coincidence the *Arachne* was entering a gravitic field through which were lines of force leading directly to Ganymede. Nobody—with the exception, perhaps, of Parsons—would have guessed that he had timed everything to that end, even the game of billiards!

The *Arachne* sped away on her new course. McNab felt pretty good. He even "whustled" a bit. Then he revved up the motor to her limit. This wasn't usually done on an old tub like this, but this was a special occasion. McNab

then got a bottle and some white suspicious-looking tablets, and went back to Parsons. He dissolved the tablets in the "whuskey" and gave Parsons some to drink. Thus he made sure that for an indefinite period Parsons would be "indisposed"! Then he went back to his job.

It wasn't long before Caperton was calling, though McNab pretended he didn't know. Let the old curmudgeon wonder why the *Arachne* had changed her course. McNab was far too busy now, playing a new kind of billiard game, only it was more like pool, because there were more balls—more moons, planets, satellites, and the like. But if you could play a good game with three balls, what a game you should be able to play with more balls than anybody could count, and most of them bigger than the Earth itself! Not Ganymede, of course. It was only seven tenths the size of the Earth, third closest to Jupiter of the four biggest moons—

But he stopped thinking about astronomical details. He was too busy playing "carom shots" with the *Arachne*. Here you had to figure angles, and plenty of them. So many moons and satellites, all pulling against you if you didn't know how to handle them, but gentle as lambs and pulling for you, if you did. McNab flattered himself that he knew how to make them pull for him. He could make almost anything and anybody—especially Parsons—pull for him if he figured out beforehand just how to do it.

Now and again he went to see if Parsons was sleeping soundly. Occasionally he heard Caperton calling the *Arachne* over Interplanetary Telephone, but he pretended not to hear. He listened to bulletins about the catastrophe on Ganymede, and they spurred him to more and better effort. It was quite a race. A lot of fancy streamliners were heading for Ganymede—the survivors

on Ganymede, and those two ships of Caperton's, couldn't hold out much longer. Whatever ship reached Ganymede first would be forever famous. So would her captain be—even if he reached Ganymede without knowing it!

Yes, it was quite a race, and it took wit to win with an old tub like the *Arachne*. But there wasn't a skipper in space who knew as much about just how to grab at this line of force between these two worlds, and that line of force between those two worlds, better than did Josh McNab. Moreover, he grabbed wherever he could. His nature was rather grasping anyhow, if the truth must be told, and now he exercised the special gift of his nature with everything he had. One might have thought he was trying his level best to save Parsons and the *Arachne*, but it must be confessed that he thought a great deal about the future of Josh McNab, too. It might all be behind him by now, but if it was, he was going out in a blaze of glory. For he had studied those bulletins about the stranded Caperton ships on Ganymede, and he already knew just what was wrong.

"THOSE YOUNG squirts o' engineerrrs on th' streamlinerrrs!" he said to nobody in particular. "They dinna ken nothin'!"

He could, he knew, have both ships heading out from Ganymede within ten minutes after the *Arachne* landed. Nobody would think it strange that the captain of the *Arachne* didn't show up for ten minutes after landing—as he would not. Those white tablets in whiskey had assured that. He didn't want Parsons spoiling anything by saying too much.

There were no helicopter tugs to warp him in to Ganymede, but that didn't faze McNab. One expected things like that in a great catastrophe. He could land without tugs. He had performed the "somersault" of the *Arachne* with-

out turning a hair, when he had changed ends to approach Ganymede. He had timed his arrival so that he would land where the two Caperton ships were.

Landed, he got into one of those silly suits you had to wear on Ganymede to keep from suffocating or being smashed flat or something—he could never see much sense in wearing them, or pretended he couldn't—and went out to have a look at the stranded ships. Things were tough all right, and a lot of people were dead. Some sort of bacterial attack had simply killed people off. Everybody had simply been snuffed out, that was all—except those who had been warned, or had smelled it coming, or something; there must have been a warning or there would have been no survivors—and Ganymede would become the empty moon it had always been until fresh colonists decided to take a chance.

McNab reported himself aboard the first liner. He went straight into the engine room, with scant show of respect for officers or chief engineers aboard. He found what he knew he would find—perfectly simple mechanical ailments that a child should have been able to correct. So he pretended, anyhow, well knowing that none but McNab, in all Caperton's employ, could have picked the bugs out of that motor.

He left the first ship, staggered to the next. The first ship was away from Ganymede, heading for Jupiter and home, before McNab found all the bugs in the second motor. But he found them.

McNab took a good look around Ganymede, sighed deeply and went back to the *Arachne* and the peacefully sleeping Parsons. He got the ship under way for Jupiter, and then set about rousing Parsons to his responsibilities! It would still take some little time, of course, because McNab planned it that way!

BUT WHEN Parsons opened his eyes, finally, it was to find himself lying supine on the floor at one end of the billiard table. At that same table McNab was calmly making the most unbelievable shots and tunelessly whistling.

"Fainted, eh?" said McNab unconcernedly. "I thought ye were never comin' aroon'. We're dockin' at Jupiter soon, an' I've been afraid ye'd no rouse yerself in time"

Parson staggered to his feet.

"Just how much of a run did you make while I was out, McNab?" he asked suspiciously. "And why should I be so hungry, having been out such a short time? And why do I taste dead mice in my mouth?"

McNab said that he'd run enough to win the thousand dollars, hands down; that he knew nothing of the condition of Parsons' stomach; that he gathered from the chronically ill-natured expression on Parsons' face that his mouth *always* tasted as though it were filled with dead mice—

"Caperton's calling," said Parsons, interrupting McNab's thick-brogue monologue. "Has he called while I've been out?"

"Oh, aye!" said McNab.

"About what? Never mind, I'll ask him."

McNab, while he waited for Parsons

to get the bad news, couldn't hit anything! He couldn't even keep the billiard balls on the table. Parsons came back. He was grinning sheepishly. He handed McNab his wallet—not just a thousand dollars, but his fat, well-filled wallet.

"Caperton says it's the greatest, fastest run ever made by a Caperton ship. He said I could pick any of the streamliners I wanted to command. Thanks to you, McNab, I'm the pick of Caperton liner captains! Oh, yes, I can pick my chief engineer, so if—"

McNab's mouth was shaped in a soundless whistle. He offered no comment. Parsons got it, finally, and jumped to the end of his story.

"I told him, of course, that I'd rather carry humble freight on the old *Arachne*—provided she were kept indefinitely in service—than the richest, snootiest passengers on any other ship of the line! That what you were waiting to hear?"

McNab didn't answer in words. Yet he answered in a way that was most eloquent for a Scotchman. He returned Parsons' wallet, unopened! They played billiards then until helicopter tugs came out from Jupiter to warp them in. But something had happened to throw them off their game for neither, apparently, could make even the simplest carom shot!

# APPEAL



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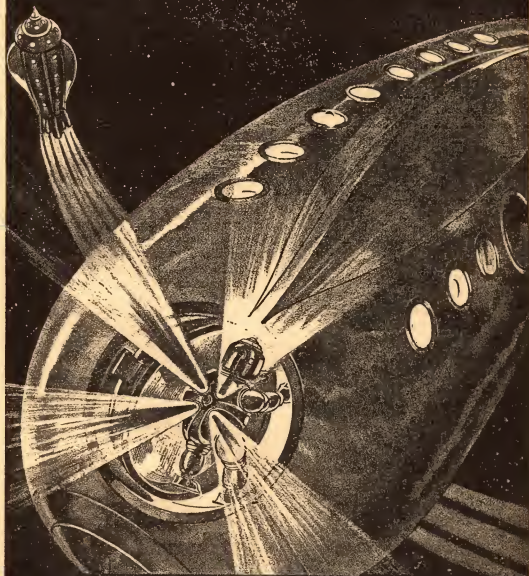
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MARK



# COSMIC ENGINEERS



BY CLIFFORD D. SIMAK

## COSMIC ENGINEERS

### *Part Two of Clifford D. Simak's great three-part novel of intelligence fighting to save a Universe!*

#### Synopsis for Part II.

Caroline Martin, in the year 5980, is a member of the Earth-Mars Research Commission. The Earth and Mars are arrayed against Jupiter in a struggle for the domination of the Solar System. Caroline discovers the secret of controlling a space-time distortion which the military board wishes to use as a weapon against Jupiter. Knowing that the use of such a weapon may spell the doom of the System, Caroline refuses to divulge the secret. She is tried before a military court and sentenced to space. Set adrift in a space-shell just inside the orbit of Pluto, she faces the prospect of living out her life in the desolation of space.

Prior to her discovery of the space-time warp, she and a fellow worker, with whom she is in love, have perfected a drug which suspends animation. Her lover has smuggled a supply of the drug aboard the space-shell, and when she finds it, she believes he has a plan to effect her rescue. Accordingly, she puts herself into suspended animation, only to find that while all other physiological functions are suspended, her brain still works. Her lover fails to come and centuries pass, while she lies in suspended animation—but with her brain working at full capacity. Thought is the only thing left for her, and, accordingly, she must think.

In the year 6948, almost 1,000 years later, she is rescued and restored to animation by Gary Nelson and Herb Harper, newsmen on an assignment to write a series of articles concerning the Solar System.

*Arriving at Trail's End, Pluto's only*

*community, they meet Dr. Kingsley, in charge of Solar Government laboratories, and Tommy Evans, who expects to fly a new type ship to Alpha Centauri and thus become the first man to go beyond the Solar System.*

Dr. Kingsley has been receiving strange messages out of space, but is unable to decipher them. Caroline, her brain sharpened by a thousand years of thought, is able to understand the messages, finds they are from entities calling themselves the Cosmic Engineers. The Engineers live near the rim of the exploding universe and are asking for volunteers to fight a menace from outside the universe—a menace that threatens the very existence of the universe. The five, caught up by the old crusading fever, decide to travel to the planet of the Cosmic Engineers and help fight the menace. Under the direction of the Engineers, they start to build apparatus which will enable them to cross the unimaginable light-years to the edge of space-time.

#### VI.

A GHOSTLY machine was taking shape upon the hard, pitted, frozen surface of the field. A crazy, ghostly machine that glimmered weirdly in the half-light of the stars. A machine with mind-wrenching angles, with flashing prisms and spidery framework, a towering skeleton of a machine that stretched out spaceward.

Made of material in which the atomic motion had been stilled, it stood defiant against the most powerful forces of man or void. Anchored magnetically to the core of the planet, it stood planted

firmly, a spidery, frail-appearing thing, but with a strength that would stand against the unimaginable drag of a cosmic space-time warp.

From it, long cables snaked their way over the frozen surface to the laboratory power plants. Through those slender cables, their resistance lowered by the bitter cold, tremendous power loads could be poured into the strange machine.

"They're space-nuts," grumbled Ted Smith at Gary's elbow. "They're fixin' to blow Pluto all to hell. I wish there was some way for me to get away from here before the fireworks start."

Herb's voice crackled in Gary's helmet-phones, answering the complaint. "Hell, there just won't nothing happen. That contraption looks more like something a kid built with building blocks than a machine. I can't see how it ever will work."

"I gave up long ago," Gary confessed. "Caroline tried to explain it to me, but I guess I'm just sort of dense. I can't make head or tail of it. All I know is that it's supposed to be an anchor post, a thing that will help the Engineers set up this space warp and after it is set up, will operate to hold it in position."

"I never did set any stock by that Engineer talk," said Ted, "but there's something I've been wanting to tell you two. Haven't been able to catch you. You've been so busy. But I wanted to tell you about it, for you're the only two who haven't gone entirely starbatty."

"What is it?" Gary asked.

"Well, you understand," Ted explained, "I don't attach much meaning to it, but it does seem kind of funny. A few days ago I sneaked out for a walk. Against orders, you know. Aren't supposed to get out of sight of the settlement. Too many things can happen here.

"But, anyhow, I went for a walk.

Out along the mountain and over that carbon dioxide glacier and down into a little valley that lies just over the shoulder of the glacier."

He paused dramatically.

"You found something there?" asked Gary, the hair at the base of his skull tingling with apprehension.

"Sure did," declared Ted proudly. "I found some ruins. Chiseled white stone. Scattered all over the valley floor. As if there had been a building there at one time and somebody had pulled it down stone by stone and threw the stones around."

"Sure it wasn't just boulders or peculiar rock formation?" asked Gary.

"No, sir," said Ted emphatically. "There were chisel marks on that stone. Workmen had dressed it at some time. And it was white stone. You show me any white stone around here."

Gary understood what the radio operator meant. The mountains were black, black as the emptiness of space. He turned his head to stare at those jagged peaks that loomed over the settlement, their spearlike points faintly outlined against the black curtain of the void.

"Say," said Herb, "that sounds as if what the Engineers said about somebody else living here at one time might be true."

"If Ted found building stone, that's exactly what it means," Gary asserted. "That would denote a city of some kind. Intelligence of some kind. It takes a certain degree of intelligence to work stone."

"But," argued Herb, "how could anyone have lived here? You know that Pluto cooled quick. Lost its lighter gases in a hurry. Its oxygen and carbon dioxide locked up in snow and ice. Too cold for any life."

"I know all that," Gary agreed, "but it seems we can't be too sure of anything in this business. If Ted is right, it means the Engineers were right on

at least one count where we all were wrong. It sort of gives a fellow more faith in what is going on."

"Well," said Ted, "I just wanted to tell you. I was going to go out there again some day and look around, but since then I've been too busy. Ever since you sent that story out to your paper, space has been full of messages for me—governmental stuff, messages from scientists and cranks. Don't give a man no time to himself at all."

AS THE radio man walked back to his shack, Gary looked toward the laboratory. Two space-suited figures were coming out of the main lock.

"That's Caroline and Kingsley," said Herb. "They've been up there to talk to the Engineers again. Got stuck on something. Wanted the Engineers to explain it for them."

"Looks to me like it's about finished," said Gary. "Caroline told me she didn't know just how much longer it would take, but that she had hopes of getting it into working order in another day or two. Tommy's gone without sleep the last twenty hours, working to get his ship in tiptop shape. They've gone over the thing from control panel to rocket tubes."

"What I'd like to know," said Herb irritably, "is just how we are going to use the ship in getting out to where the Engineers are."

"Those are instructions," said Gary. "Instructions from the Engineers. We don't dare do anything around here unless they say it's all right."

The space-suited figures were coming rapidly down the path to the space-field. Gary hailed them when they came nearer. "Find out what was wrong?" he asked.

Kingsley's voice boomed at him. "Several things wrong," he declared. "This ought to put it in working shape."

The four of them advanced on the machine. Gary fell into step with Caro-

line and looked at the girl's face through her helmet port. "You look fagged out," he said.

"I am tired," she confessed. They walked a few steps. "We had so much to do," she said, "and apparently so little time to do it in. The Engineers sound as if they are getting desperate. They seem to think the danger is very near."

"What I can't figure out," Gary told her, "is what we are going to do when we get there. They seem to be head and shoulders over us in scientific knowledge. If they can't work it out, I can't see how we can help them."

Her voice was full of weariness as she answered him. "Neither do I," she said, "but they seemed so excited when they found out who we were, when I described our Solar System to them and told them that the race had originated on the third planet. They asked so many questions about what kind of beings we were. It took a lot of explaining to get across the idea that we were protoplasmic creatures, and, when they finally understood that, they seemed even more excited."

"Maybe," Gary suggested, "protoplasmic beings are a rarity throughout the universe. Maybe they never heard of folks like us before."

She wheeled on him. "There's something funny about it all, Gary," she said. "Something funny about how anxious they are for us to come, how insistent they are to find out everything about us . . . the extent of our scientific knowledge, our past history."

He thought he detected a quaver of fear in her voice. "Don't let it get you," he said. "If it gets too funny, we can always quit. We don't have to play their game, you know."

"No," she said, "we can't do that. They need us, need us to help them save the universe. I'm convinced of that."

She stepped quickly forward to help Kingsley.

"Hand me that hammer," said Kingsley's voice, and Gary stooped down, picked up a heavy hammer from the base of the machine and handed it to the scientist.

"Hell," complained Herb, "that's all we've done for days now. We've handed you wrenches and hammers and pins and bolts until I see them in my sleep."

Kingsley's chuckle sounded in their helmets as he swung the hammer against a crossbar, driving it into a slightly different angle.

GARY CRANED back his neck and gazed up the spiraling, towering height of the machine, out beyond into the blackness of space, studded with cruel-eyed stars. Out there, somewhere, was the rim of space. Out there, somewhere, a race of beings, who called themselves the Cosmic Engineers, were fighting a great danger which threatened the universe. He tried to imagine such a danger . . . a danger that would be a threat to that mighty bowl of matter and energy men called the universe, a living, expanding thing inclosed by curving time and space. But his brain swam as he thought and he gave it up. It was entirely too big to even think about.

Tommy Evans was coming across the field from the hangar. He hailed them joyously. "The old tub is ready any time you are," he shouted.

Kingsley straightened from adjusting a series of prisms set around the base of the machine. "We're ready now," he said.

"Well, then," said Herb, "let's get going."

Kingsley stared out toward space. "Not yet," he said. "We're swinging out of direct line with the Engineers. We'll wait until the planet rotates again. We can't hold the warp con-

tinuously. If we did, the rotation of Pluto would twist it out of shape. The machine, once the warp is set up, will act automatically, establishing the warp when it swings into the right position and maintaining it through forty-five degrees of Pluto's rotation."

"What happens," asked Gary, "if we can't make the trip from here to the edge of the universe before Pluto travels that forty-five degrees? We might roll out of the warp and find ourselves marooned thousands of light-years between galaxies."

"I don't know," said Kingsley. "I'm trusting the Engineers."

"Sure," said Herb, "we're all trusting the Engineers. I hope to Heaven they know what they're doing."

Together the five of them trudged up the path to the main lock of the laboratory. "Something to eat," said Kingsley, "and a good sleep and we'll be starting out. All of us are pretty tuckered now."

In the little kitchen they crowded around the table, gulped steaming coffee and munched sandwiches. Beside Kingsley's plate was a sheaf of space-grams that Ted had brought up for him to read. Kingsley leafed through them irritably.

"Cranks," he rumbled. "Hundreds of them. All with ideas crazier than the one we have. And the biggest one of them all is the government. Imagine the government forbidding us to go ahead with our work. Orders to desist. Some damn law that the Purity League got passed a hundred years or more ago and still standing on the statutes. Gives the government power to stop any experiment which might result in the loss of life or the destruction of property." He snorted angrily.

"The Purity League is still going pretty strong," said Gary, "although it works mostly undercover now. Too much politics mixed up in it."

He dug into the pocket of his coat

and hauled forth a sheet of yellow paper. "I got this a while ago," he said. "I plain forgot about it until now. Too much other excitement."

He handed the sheet to Kingsley. The folded paper crackled crisply as Kingsley unfolded it. It was a sheet off the teletype in the *Space Pup* and it read:

NELSON, ABOARD SPACE PUP  
ON PLUTO. SOLAR GOVERNMENT  
ORDERED OUT SOLAR POLICE  
SECRETLY TWO DAYS AGO TO  
ENFORCE ORDER TO STOP EDGE  
OF UNIVERSE TRIP. THIS IS  
WARNING. KEEP YOUR NOSE  
OUT OF WHATEVER IS GOING  
ON.

KINGSLEY crumpled the message savagely in his fist. "When did you get this?" he thundered.

"Just a couple of hours ago," said Gary. "It will take them days to get here."

"We'll be gone long before they even sight Pluto," Tommy said, his words mumbled through a huge bite of sandwich.

"That's right," agreed Kingsley, "but it makes me sore. The damn government always meddling in other people's affairs. Setting itself up as a judge and jury. Figuring it never can be wrong." He growled wickedly at the sandwich he held in one mighty fist, bit at it viciously.

Herb looked around the room. "This being sort of a farewell banquet," he said, "I sure wish we had something to drink. We ought to drink a toast to the Solar System before we leave it. We ought to make it just a little like a celebration."

"We'd have had something to drink if you hadn't been so clumsy with that Scotch," Gary reminded him.

"Hell," retorted Herb, "that would have been gone long ago, with you making a pass at it every time you came in reach." He sighed and tilted

his coffee cup against his face.

Kingsley's laugh thundered through the room. "Wait a minute, boys," he said. He went to a cupboard and removed a double row of canned vegetables from a shelf. A quart bottle filled with amber liquor was revealed. He set it on the table.

"Wash out your coffee cups," he said. "We haven't any glasses."

The liquor splashed into the coffee cups and they stood to drink a toast.

The telephone in the next room rang.

They set down their cups and waited as Kingsley went to answer it. They heard his roar of excitement and quick fire of rumbling questions. Then he was striding back into the room.

"My assistant, Jensen, was up in the observatory just now," he shouted at them. "He spotted five ships coming in, only a few hours out. Police ships!"

Herb had lifted his cup and now with a clatter it fell to the table, breaking. The liquor dripped onto the floor.

Gary flared at him. "What's the matter with you?" he asked. "You get the shakes every time you get anywhere near a drink."

"That message Gary got," Tommy was saying. "There must have been something wrong. Maybe the ships were out near Neptune when they were ordered out here."

"What would they be doing out near Neptune?" snapped Herb.

Tommy shrugged. "Police ships are always snooping around," he said. "You find them everywhere."

They stared at one another in a deathly silence.

"They can't stop us now," whispered Caroline. "They just can't."

"There's still a couple of hours before the space warp contact with the Engineers would be broken if we set it up now," said Tommy. "Mabe we could make it. The ship is ready."

"Ask the Engineers," said Gary.



"Find out how soon they can get us there."

Kingsley's voice thundered commands. "Caroline," he was shouting, "get the Engineers! Find out if it would be safe to start now. Tommy, get out the spaceship! The rest of you grab what stuff we need and get down to the field."

The room was a swirl of action. All of them were rushing for the door.

Kingsley was at the telephone, talking to Andy. "Get the hangar doors open," he was shouting. "Warm up the tubes. We're taking off."

THROUGH THE THUD of running feet, the rumbling of Kingsley's voice, came the high-pitched drone of the thought-machine sending set. Caroline was talking to the Engineers.

More snatches of telephone conversation. Kingsley talking with Jensen now. "Get down to the power house. Stand ready to give us all the juice you have. The leads will carry everything you can throw into them. We'll need a lot of power."

Gary was struggling into his space-armor when Caroline came into the room.

"We can make it," she shouted excitedly. "The Engineers say we'll be there in almost no time at all. Almost instantaneous."

Gary held her space-suit for her while she clambered into it, helped her fasten down the helmet. Kingsley was puffing and grunting hauling the space-armor over his portly body.

"We'll beat them," he was growling. "Damn them, we'll beat them yet! No government is going to tell me what I can do and what I can't do."

Out of the air lock, they raced down the path to the field. In the center of the field reared the ghostly machine, like a shimmering skeleton standing guard over the bleakness that was Pluto. As he ran, Gary glanced up

and out into space.

A voice sang in his brain, the voice of his own thoughts: "We're coming! Hang on, you Engineers! We're on our way. Little puny man is coming out to help you. Mankind is marching to another crusade! To the biggest crusade he has ever known!"

Tommy Evans' mighty ship was at the far end of the field, a gleaming thing of silver, with the tubes a dull red, preheated to stand the sudden flare of rocket blasts in the deadly cold of Pluto's surface.

Yes, thought Gary, another crusade. But a crusade without weapons. Without even knowing who the enemy might be. Without a definite plan of campaign. With no campaign at all. With just an ideal and the sound of bugles out in space. But that was all man had needed . . . ever. Just an ideal and the blaring of the bugles.

Caroline cried out in wonder, almost in fear, and Gary glanced toward the center of the field.

The machine was gone! Where it had stood there was nothing, no faintest hint it had ever stood there. Just empty field and nothing else.

"Jensen turned on the power!" Kingsley shouted. "The machine is warped into another dimension. The road is open to the Engineers."

Gary pointed out into space. "Look," he yelled.

A faint, shimmering circle of light lay far out into the black depths. A slow wheel of misty white. A nebulous thing that hadn't been there before.

"That's where we go," said Kingsley, and Gary heard the man's breath whistling through his teeth. "That's where we go to reach the Engineers."

## VII.

TOMMY'S nimble fingers flew over the rocket bank, set up a take-off pattern. His thumb tripped the firing

lever and the ship surged up from the field with the thunder of the rocket blasts shuddering through its framework.

"Hit it dead center," warned Kingsley and Tommy nodded grimly.

"Don't you worry," he snorted. "I will hit it."

"I'd like to see the look on the face of them dumb cops when they reach Pluto and find us gone," said Herb. "Thought they were putting over a fast one on us."

"It'll be all right if they don't set down right into that machine down there," Gary declared. "If they did that, something would happen to them . . . and happen awful fast."

"I told Ted to warn them away from it," Kingsley said. "I don't think they could hurt the machine, but they'd sure get messed up themselves. They may try to destroy it, and if they do, they're in for a real surprise. Nothing short of atomic power would do that." He chuckled. "Stilled atomic-whirl and rigid space-curvature," he said. "There's material for you!"

The ship lanced swiftly through space, heading for that wheeling circle of misty light.

"How far away would it be?" Gary asked and Kingsley shook his head.

"Not too far," he said. "No reason for it being too far away."

They watched it through the vision plate, saw the wheel of light expand, become a great spinning, frosty rim that filled the plate and in its center a black hole like a hub.

Tommy set up a corrective pattern and tripped the firing lever. The crosshairs on the destination panel bore dead center on the night-black hub.

The wheel of light flared out, the hub became bigger and blacker, a hole in space—as if one were looking through it into space, but into a space where there were no stars.

The light disappeared. Just the

black hub remained, filling the vision plate with inky blackness. Then the ship was flooded with that same blackness, a cloying, heavy blackness that seemed pressing in upon them.

Caroline cried out softly and then choked back the cry, for blackness was followed almost instantly by flooding light.

The ship was diving down toward a city, a monstrous city that jerked Gary's breath away. A city that piled height on height, like gigantic steps, with soaring towers that pointed at them like Titan fingers. A solid, massive city of gleaming white stone and square, utilitarian lines, a city that covered mile on mile of land, so that one could see no part of the planet which bore it.

Three suns blazed in the sky; one white, two a misty blue, all three pouring out a flood of light and energy that, Gary realized, would have made Sol seem like a tiny candle.

Tommy's fingers flew over the rocket banks, setting up a braking pattern. But as he did so, the speed of the ship seemed to slow, as if they were driving into a soft, but resistant cushion.

And in their brains rang a voice of command . . . a voice telling them to do nothing . . . that they and their ship would be brought down to the city in safety. Not so much like words as if each man had thought the thought himself, as if each one of them knew exactly what to do.

Gary glanced at Caroline and saw her lips shape a single word. "Engineers."

So it hadn't been a nightmare after all. There really were a people who called themselves the Cosmic Engineers—there really was a city—

The ship still plunged toward the city, but its speed was slowing down, and now Gary realized that when first they had seen this pile of stone they had been many miles away. In comparison to the city, they and their ship

were tiny things—little things, like ants crawling in the shadow of a mountain.

THEN THEY were within the city, or at least its upper portion. The ship flashed past a mighty spire of stone and swung into its shadow. Below them they saw new details of the city, winding streets and broad parkways and boulevards, like tiny ribbons in the distance. A city that could thrill one with its mere bigness. A city that would have put a thousand New Yorks to shame. A city that dwarfed even the most ambitious dreams of mankind. A million of Man's cities piled into one. Gary tried to imagine how big the planet must be to bear such a city, but his mind whirled and refused to think.

They were dropping toward one of the fifth tiers of buildings, down and down, closer and closer to the massive blocks of stone. So close now that their vision was cut off, and the terrace of the tier seemed like a broad, flat plain.

A section of the roof was opening, like a door opening outward into space. The ship, floating on an even keel, drifted gently downward, toward that yawning trapdoor. Then they were through the door, with plenty of room to spare, were floating softly down between walls of delicate pastel hues.

The ship settled with a gentle bump and was still. They had arrived at the end of their trip.

"Well, we're here," said Herb. "I wonder what we're supposed to do."

And as if in answer to his question the voice came again, the voice that wasn't a voice, but as if each man were thinking for himself.

It said: "This is a place we have especially prepared for you. You will find the gravity and the atmosphere and the surroundings natural to yourselves. You will need no space-suits, no artificial trappings of any sort. Food is waiting you."

They stared at one another in amazement.

"Say," said Herb, "I think I'll like this place. Did you hear that? Food!"

Tommy got out of the pilot's chair. "What are we waiting for?" he asked. He strode to the inner valve of the air lock and spun the wheel. The others crowded behind him.

They stepped out of the ship onto a great slab of stone placed in the center of a gigantic room. The stone, apparently, was merely there for the ship to rest upon, for the rest of the floor was paved in scintillating tiny blocks of mineral that flashed and glinted in the light from the three suns pouring in through a huge, translucent skylight. The walls of the room were done in soft pastel shades, and on the walls were hung huge paintings, while ringed about the ship was furniture, perfect rooms of furniture, but with no dividing walls. An entire household set up in one room.

A living room, a library, bedrooms and a dining room. A dining room with massive oaken table and five chairs. And upon the table a banquet to do justice to a king.

"Chicken!" said Herb and the single word carried a weight of awe.

"And wine," said Tommy.

They stared in amazement at the table. Gary sniffed. He could smell the chicken.

"Antique furniture," said Kingsley. "That stuff would bring a fortune back in the Solar System. Mostly Chatterton—and it looks authentic. And beautiful examples—museum pieces, every one. Thousand years old, at least." He stared from piece to piece. "But how did they get it here?" he burst out.

CAROLINE'S laughter rang through the room, a chiming, silver laughter that had a note of wild happiness in it.



*"The Patrol's coming—head for that Hole in a hurry!"*

"What's the matter?" demanded Tommy.

"I don't see anything funny," declared Herb. "Unless there is a joke. Unless that chicken really isn't chicken."

"It's chicken," Caroline assured him. "And the rest of the food is real, too. And so is the furniture. Only I didn't think of it as antique. You see, a thousand years ago, that sort of furniture was the accepted thing. It was in style. They were the smartest sort of pieces to have in your home."

"But you," said Gary. "What did you have to do with it?"

"I told the Engineers," she said. "They asked me what we ate and I told them. They must have understood me far better than I thought. I told them the kind of clothes we wore, and the kind of furniture we used. But, you see, the only things I knew about were out of date, things the people used a thousand years ago. All except the chicken. You still eat chicken, don't you?"

"And how," grinned Herb.

"Why," said Gary, "this means the Engineers can make anything they want to. They can arrange atoms to make any sort of material. They can transmute matter!"

Kingsley nodded. "That's exactly what it means," he said.

Herb was hurrying for the table.

"If we don't get there, there won't be anything left," Tommy suggested.

The chicken, the mashed potatoes and gravy, the wine, the stuffed olives—all of the food was good. It might have come out of the kitchen of the Solar System's smartest hotel only a few minutes before. After days of living on coffee and hastily slapped-together sandwiches, they did full justice to it.

Herb regarded with regret the last piece of chicken and shook his head dolefully.

"I never tasted such food in my life," Kingsley declared.

"They asked me what we ate," Caroline said, "so I thought of all the things I like the best. They didn't leave out a single thing."

"But where are the Engineers?" asked Gary. "We haven't seen a thing of them. We have seen plenty of what they have done and can do, but not one has showed himself."

Footsteps rasped across the floor and Gary swung around in his chair. Advancing toward them was a thing that looked something like a man, but not exactly a man. It was the same height, had the same general appearance—two arms, two legs, a man-shaped torso, a head. But there was something wrong with the face; something definitely wrong with the body.

"There's the answer to your question," said Tommy. "There is an Engineer now."

Gary scarcely heard him. He was watching the Engineer intently as the creature approached. And he knew why the Engineer was different. Cast in human shape, he was still a far cry from the humans of the Solar System, for the Engineer was a metal man! A man constructed of metallic matter instead of protoplasm. "A metal man," he said.

"That's right," replied Kingsley, and keen interest rather than wonderment was in his words. "This must be a large planet. The force of gravity must be tremendous. Protoplasm probably would be unable to stand up under its pull. We'd probably just melt down if the Engineers hadn't fixed up this place for us."

"You are right," said the metal man, but his mouth didn't open, his facial expression didn't change. He was speaking to them as the voice had spoken to them back on Pluto, as the voice had spoken to them as they entered the city. The Engineer stopped

beside the table and stood stiffly, his arms folded across his chest.

"Is everything satisfactory?" asked the Engineer.

IT WAS funny, this way he had of talking. No sound, no change of expression, no gesture—just words burning themselves into one's brains, the imprint of thought thrust upon one's consciousness.

"Why, yes," said Gary, "everything is fine."

"Fine!" shouted Herb, waving a drumstick. "Why, everything is perfect."

"We tried so hard to do everything just as you told us," said the Engineer. "We are pleased that everything is all right. We had a hard time understanding one thing. Those paintings on the wall. You said they were things that you had and were used to and we wanted so much to make everything as you wanted it. But they were something we had never thought of. Something we had never done. We are sorry we were so stupid. They are fine things. When this trouble is over we may make some of them. They are so very beautiful. How queer it was we hadn't thought of them."

Gary swung around and stared at a painting opposite the table. Obviously it was a work in oil, and seemed a very fine one. It portrayed some fantastic scene, a scene with massive mountains in the background and strange twisted trees and waist-high grass and the glitter of a distant waterfall. A picture that any art exhibit would be proud to hang.

"You mean," he asked, "that these are the first pictures you ever painted?"

"We hadn't even thought of them before," said the Engineer.

They hadn't known of pictures before. No single Engineer had ever thought to capture a scene on canvas. They had never wielded an artist's

brush. But here was a painting that was perfect in color and in technique, well balanced, pleasing to the eye!

"One thing about you fellows," said Tommy, "is that you will tackle anything."

"It was so simple," said the Engineer, "that we are ashamed we never thought of it."

"But this trouble," rumbled Kingsley. "This danger to the universe. You told us about it back on Pluto, but you didn't explain. We would like to know."

"That," said the Engineer, "is what I am here to tell you."

No change in the tone of thoughts—no slightest trend of emotion. No change of expression on his face.

"We will do whatever we can to help," Kingsley told him.

"We are sure of that," said the Engineer. "We are glad that you are here. We were so satisfied when you said you'd come. We feel you can help us very, very much."

"But the danger," said Caroline. "What is the danger?"

"I will begin," said the Engineer, "with information that to us is very elemental. I do not believe you know it. You had no chance to find out, being so far from the edge of the universe. But we who have lived here so long found the truth, long ago.

"This universe is only one of many universes. Only one of billions and billions of universes. We believe there are as many universes as there are galaxies in our universe."

The Earthlings looked in astonishment at him. Gary glanced at Kingsley. The scientist seemed speechless. He was sputtering, trying to talk. "There're over fifty billion galaxies within the universe," he finally said. "Or at least that is what our astronomers believe."

"Sorry to contradict," said the Engineer. "There are many more than that.



Many times more than that."

"More!" said Kingsley faintly, for him.

"The universes are four-dimensional," said the Engineer, "and they exist within a five-dimensional inter-space—perhaps another great super-universe with the universes taking the place of galaxies."

"A universe within a universe," said Gary, nodding his head. "And might it not be possible that this super-universe is merely another universe within an even greater super-universe?"

"That might be so," declared the Engineer. "It is a theory we have often pondered on. But we have no way of knowing. We have so little knowledge—"

A LITTLE SILENCE fell upon the room, a silence filled with awe. This talk of universes and super-universes. This dwarfing of values. This relegating of the universe to a mere speck of dust in an even greater place!

"The universes, even as the galaxies, are very far apart," the Engineer went on. "So very far apart that the odds against two of them meeting are almost incomprehensibly great. Farther apart than the suns in the galaxy, farther apart, relatively, than the galaxies in the universe. But entirely possible that, once in eternity, two universes will meet."

He paused, a dramatic silence in his thought. "And that chance has come," he said. "*We are about to collide with another universe.*"

They sat in stunned silence.

"Like two stars colliding," said Kingsley. "That's what formed our Solar System."

"Yes," said the Engineer, "like two stars colliding. Like a star once collided with our Sun."

Kingsley jerked his head up.

"You knew about that?" he asked.

"Yes, we knew about that. It was

long ago. Many million years ago."

"How do you know about this other universe?" asked Tommy. "How could you know?"

"Other beings in the other universe told us," said the Engineer. "Beings that know much more in some lines than we know. Beings we have been talking to for many years."

"Then you knew for many years that the collision would take place," said Kingsley.

"Yes, we knew," said the Engineer. "And we tried hard, the two peoples. We of this universe and those of the other universe. We tried hard to stop it. But there seemed no way. And so at last we agreed to summon, each from their own universe, the best minds we could find. Hoping they perhaps could find a way . . . find a way where we have failed."

"But we aren't the best minds of the universe," said Gary. "We are far down in the scale. Our intelligence, comparatively, is very low. We are just beginning. You know more than we can hope to know for centuries to come."

"That may be so," agreed the Engineer, "but you may have something else. You may have a courage we do not possess. You may have an imagination we could not summon. Each people must have something to contribute. Remember—we had no art; our minds are different. It is so very important that the two universes do not collide."

"What would happen," asked Kingsley, "if they did collide?"

"The laws of the five-dimensional inter-space," explained the Engineer, "are not the laws of our four-dimensional universe. Different results would occur under similar conditions. The two universes will not actually collide. They will be destroyed before they collide."

"Destroyed before they collide?" asked Kingsley.

"Yes," said the Engineer. "The two universes will 'rub'—come so close together that they will set up a friction, or a frictional stress, in the five-dimensional inter-space. Under the inter-space laws this friction will create new energy . . . raw energy . . . stuff that never has existed before. Each of the universes will absorb some of that energy, will drink it up. The energy will rush into our universes in ever-increasing floods. Unloosed, uncontrollable energy. It will increase the mass energy in each . . . will give each a greater mass."

KINGSLEY leaped to his feet, tipping over a coffee cup, staining the table cloth. "Increase the mass!" he shouted. "But—" Then he sat down again, like a man from whom the warp of life has been drawn, a strangely beaten figure. "Of course that would destroy us," he mumbled. "Presence of mass is the only cause for the bending of space. An empty universe would have no space curvature. Totally devoid of matter, its space would be entirely uncurved. The more mass there is in space, the tighter space is curved. The more matter there is, the less space there is for it to occupy.

"Flood the universe with energy from inter-space," the Engineer agreed, "and space begins curving back, faster and faster, crowding the matter it does contain into smaller space . . . we would have a contracting rather than an expanding universe."

"Throw enough of that new energy into the universe," rumbled Kingsley excitedly, "and it would be more like an explosion than anything else. All life would be wiped out, galaxies would be destroyed. Existent mass would be compacted into a tiny area. It might even be destroyed. At the best the uni-

verse would have to start all over again."

"It would start over again," said the Engineer. "There would be enough new energy absorbed by the universe for just such an occurrence as you have foreseen. The entire universe would revert to the original chaos."

"And me without my life insurance paid up," said Herb.

Gary snarled at him across the table.

Caroline leaned her elbows on the table and cupped her chin in her hands. "The problem," she said, "is to find out how to control that new energy if it does enter the universe."

"That is the problem," agreed the Engineer.

"Mister," said Gary, "if anyone can do it, this little lady can. She knows more about a lot of things than you do. I'll lay you a bet on that."

## VIII.

THE SUITS were marvelous things, flexible, with scarcely any weight at all, not uncomfortable like an ordinary space-suit.

Herb admired his before he fastened down the helmet. "You say these things will let us walk around on your planet just as if we were at home?" he asked the Engineer.

"We tried to make it comfortable for you," the Engineer replied. "We hope you find them comfortable. You came so far to help and we are so glad to see you. We hope you will like us. We have tried so hard."

Caroline looked toward the Engineer curiously. There was a queer, vague undertone to all his thought-messages, an inexplicable sense of pleading, of a desire for praise from her or from Kingsley. It made no sense, and she tried to rationalize it away. She shook her head with a little impatient gesture, but still that deep, less-than-half-conscious feeling was there.

It reminded her suddenly—with a little mounting lump in her throat—of her bird dog, a magnificent mahogany-and-white Chesapeake Bay retriever, dead these thousand years. Somehow she felt again as she used to when the dog had looked up at her after placing a recovered bird at her feet.

He was gone—gone with all the world she'd known. Her ideas were magnificent antiques—museum pieces—in this newer day. But she felt that if, somehow, that dog had been granted eternal life, he'd be searching Earth for her still, searching . . . waiting . . . hungering for the return that never came. And rising in queerly mixed ecstasies of gladness and shyness at her coming—

Kingsley spoke, and the rising feeling snapped.

"Gravity-suits," said Kingsley, almost bursting with excitement. "But even more than that! Suits that will let a man move about comfortably under any sort of conditions. Under any pressure, any gravity, in any kind of atmosphere."

"With these," Gary suggested, "we would be able to explore Jupiter."

"Sure," said Tommy, "that is easy. Only one little thing. Find a fuel that will take you there and take you out again."

"Hell," enthused Herb, "I bet the Engineers could tell us how to make that fuel. These boys are bell-ringers all around."

"If there is any way we can help you—anything you want, anything at all," declared the Engineer, "we would be so glad, so proud to help you."

"I bet you would at that," said Herb.

"Only a few of the denizens we called have arrived," said the Engineer. "More of them should have come. Others are on their way. We are afraid—"

He must have decided not to say what was in his mind, for the thought

clicked off—broken in the middle of the sentence.

"Afraid?" asked Kingsley. "Afraid of what?"

"Funny," said Gary, almost to himself. "Funny they should be afraid of anything."

"Not afraid for ourselves," explained the Engineer. "Afraid that we may be forced to stop our work. Afraid of an interruption. Afraid someone will interfere."

"But who would interfere?" asked Caroline. "Who could possibly interfere in a thing like this? The danger is a common one. All things within the universe should unite to try to stop it."

"What you say is right," declared the Engineer. "So right that it seems impossible any could think otherwise. But there are some who do not. A race so blinded by ambition and by hatred that they see in this approaching catastrophe an opportunity to wipe us out, to destroy the Engineers."

THE EARTHLINGS stood stock-still, shocked. "Now, wait a second," said Gary slowly. "Let us understand this. You mean to say that you have enemies who would die themselves just for the satisfaction of knowing that you were destroyed, too?"

"Not exactly," said the Engineer. "Many of them would be destroyed, but a select few would survive. They would go back to the point where the universe must start again, back to the point where space and time would once more begin expanding. And, starting there, they would take over the new universe. They would shape it to fit their needs. They would control it. They would have complete domination over it."

"But," cried Gary, "that is mad—utterly mad. Sacrificing a present people, sacrificing an entire universe for a future possibility."

"Not so mad," said Kingsley quietly.

"Our own Earth history will furnish many parallels. Mad rulers, power-mad dictators ready to throw away everything for the bare feel of power . . . ready to gamble with the horrors of scientific warfare. It almost happened on Earth once—back in 2896. The Earth was almost wiped out when one man yearned for power—and the man, himself, knew what the result would be. But that didn't stop him. Nothing stopped him but the people themselves, the people who finally saw where he was leading them and turned on him and killed him like the mad dog that he was."

"They hate us," said the Engineer. "They have hated us for almost a million years. Because we, and we alone, have stood between them and their dream of universal conquest. They see us as the one barrier they must remove, the one obstacle in their way. They know they never can defeat us by the power of arms so utterly that we still cannot smash their plans to take over the universe."

"And so," said Gary, "they are perfectly willing to let the collision of universes wipe you out, even if it does mean disaster and destruction for the most of them."

"They must be nuts," said Herb. "I'd like to see anyone make the people of our Solar System do a stunt like that."

"You do not understand," protested the Engineer. "For many millions of years they have been educated with the dream of universal conquest. Have been so thoroughly impregnated with the philosophy that the state, the civilization, the race, is everything . . . that the individual does not count at all . . . that there is not a single one of them who would not die to achieve that dream. They glory in dying, glory in any sort of sacrifice that advances them the slightest toward their eventual goal."

"You said that some of them would survive even if the universe, as we know

it, were destroyed," said Caroline. "How would they do that?"

"They have found a way to burst out of the universe," said the Engineer. "How to navigate the inter-space that exists outside the universe. They are more advanced in many sciences than we. If they wished, I have no doubt, they could by themselves, with no aid at all, save us from the fate that is approaching."

"Perhaps," rumbled Kingsley, "a treaty could be arranged. An armistice."

The impersonal thought of the Engineer struck at them. "There can be no peace with them. No treaty. No armistice. For millions of years they have thought and practiced war. Their every thought has been directed toward conquest. To them the word 'peace' is meaningless."

"You mean," asked Gary, horror in his voice, "that they actually want the universe destroyed? That they would fight you to prevent your saving it?"

"That," said the Engineer, "is exactly what I mean. You understand so well."

"Do you expect them to attack soon?" asked Tommy.

"We do not know. They may attack at any time. We are ready at all times. We know they will attack whenever they are ready."

"We must find a way," said Caroline. "We can't let them stop us! We must find a way!"

"We will find a way," rumbled Kingsley. "There has to be a way, and we'll find it."

"WHAT DO you call these rip-snorters you've been fighting all these years?" asked Herb.

"We call them the Hellhounds," said the Engineer, but that was not exactly what he meant. The thought brought together a certain measure of loathing mixed with hatred and fear. Hell-

hounds was the nearest the Earthlings could translate the thought.

"They can break through the time-space curve," said Caroline, musingly, "and they can travel in the fifth-dimensional inter-space." She flashed a look at Gary, a look filled with the flare of inspiration. "Perhaps," she said, "that is the answer. Perhaps that is what we should try to find the answer to."

"I don't know what you mean," said Gary, "but maybe you are right."

"The time-space curve would be rigid," said Kingsley. "Rigid and hard to unravel. Lines of stress and force that would be entirely new. That would take mathematical knowledge. That and tremendous power."

"The power of new energy," said Gary. "Perhaps the power of the energy the rubbing universes will create."

Kingsley stared at him as if he had struck him with an open hand. "You have it," he shouted. "You have it."

"But we haven't got the energy," said Gary bluntly.

"No," agreed Kingsley, "we'll have to get that first."

"And control it," said Caroline.

"Perhaps," suggested the Engineer, "we should go now. The others are waiting for us. They have come so far. Many of them from greater distances than you."

"How many are there?" asked Gary.

"Only a few," said the Engineer, "so very few. Life is so seldom found throughout the universe. The universe does not care for life. I sometimes think it is merely a strange disease that should not be here at all. That it is some accidental arrangement of matter that has no right to be. The universe is hostile to it. There are so few places where it can take root and live."

"But throughout those billions of galaxies there must be many races," declared Kingsley.

"There may be many we do not know

about," said the Engineer, "but very few that we can contact. It is so very hard to get in touch with them. And some of them would be useless to us. Races that have followed entirely different lines of development. Races that live without the application of any of the practical sciences. Races that are sunken in a welter of philosophy and thought. Races that have submerged themselves in æsthetics and are untrained for science."

"Hell," said Herb, "it takes all kinds of people to make a universe."

The Engineer led them through an air lock which opened from the room into a mighty corridor. A corridor that seemed to stretch away for inconceivable distances, a vast place that held a brooding sense of empty space.

The suits functioned perfectly. Gravity and pressure were normal and the suits themselves were far more comfortable than the space-suits developed for space-travel back in the Solar System.

Slowly they trudged down the hall behind the Engineer.

"How long did it take to build this city?" asked Gary.

"Many years," said the Engineer. "Since we came here."

"Came here?" asked Gary. "Then this isn't your native planet?"

"No," said the Engineer, but he did not offer to explain.

"Say," said Herb, "you didn't ask our names. You don't know who we are?"

Gary thought he detected a faint semblance of dry humor in the answer of the Engineer.

"Names," he said. "You mean personal designations? I know who you are without knowing names."

"Maybe," said Herb, "but we can't read thoughts like you can. We got to have names." He trotted along at the heels of the Engineer. "Don't you fellows have names?" he asked.

"We are designated by numbers," said the Engineer. "Purely as a matter of record. The individual doesn't count so much here as he does where you came from."

"Numbers," said Herb. "Just like in a penitentiary."

"If it is necessary for you to designate me," said the Engineer, "my number is 1824. I should have told you sooner. I am so sorry I forgot."

THEY HALTED before a massive door and the Engineer sounded a high-pitched thought-wave that beat fantastically against their brains. The great door slid back into the wall and they walked into a room that swept away in lofty reaches of vast distances, with a high-vaulted ceiling that formed a skylike cup above them.

The room was utterly empty of any sort of furniture. Just empty space that stretched away to the dim, far walls of soaring white. But in its center was a circular elevation of that same white stone, a daislike structure that reared ten feet or more above the white-paved floor.

Upon the dais stood several of the Engineers and around them were grouped queer misshapen things, nightmares snatched from some book of olden horrors, monstrosities that made Gary's blood run cold as he gazed upon them.

He felt Caroline's fingers closing on his arm. "Gary," her whisper was thin and weak, "what are they?"

"Those are the ones that we have called," said the Engineer. "The ones who have come so far to help us in our fight."

"They look like something a man would want to step on," said Herb, and there was a horrible loathing in his words.

Gary stared at them, fascinated by their very repulsiveness. Lords of the universe, he thought. These are the

things that represent the cream of the universe's intelligence. These things that looked, like Herb had said, something you wanted to step on.

The Engineer was walking straight ahead, toward the wide, shallow steps that led up to the dais.

"Come on," rumbled Kingsley. "Maybe we look as bad to them."

They crossed the hall and tramped up the steps. The Engineer crossed to the other Engineers.

"These," he said, "are the ones, who have come from the outer planet of the Solar System we have watched so many years."

The Engineers looked at them. So did the other things. Gary felt his skin crawling under the scrutiny.

"They are welcome," came the thought-waves of one of the Engineers. "You have told them how glad we are to have them here?"

"I have told them," declared Engineer 1824.

There were chairs for the Earthlings. One of the Engineers waved an invitation to them. They sat down.

Gary looked around. They were the only ones who had chairs. The Engineers, apparently tireless, remained standing. Some of the other things stood, too. One of them on a single leg with his second leg tucked tight against his body—like a dreaming stork—except that he didn't look like a stork. Gary tried to classify him. He wasn't a bird or a reptile or a mammal. He wasn't anything a human being had ever imagined. Long, skinny legs, great bloated belly, head with unkempt hair falling over brooding, dead-fish eyes.

One of the Engineers began to talk.

"We have gathered here," said the thought-waves, "to consider ways and means of meeting one of the greatest dangers—"

Just like a political speaker back on Earth, thought Gary. He tried to make



out which one of the Engineers was talking, but there was no facial expression, no movement of any sort to determine who the speaker might be. He tried to pick out Engineer 1824, but all the Engineers looked exactly alike.

The talk rumbled on . . . a smooth roll of thought explaining the situation that they faced . . . the many problems it presented . . . the need of acting at once . . .

Gary studied the other things round about them, the loathsome, unnatural things that had been brought here from unguessed depths of the universe. He shuddered and felt cold sweat break out upon his body as he looked at them.

Several of them were immersed in tanks filled with different liquids. One tank boiled and steamed as if with violent chemical action, another was cloudy and dirty-looking, a third was clear as water and in it lurked a thing that struck stark horror into Gary's soul. Another was confined in a huge glass sphere, through which shifted and swirled a poisonous-appearing atmosphere. Gary felt cold fingers touch his spine as he watched the sphere and suddenly was thankful for the shifting mists within it, for through them he caught sight of something that he was certain would have shattered one's mind to look upon without the shielding swirl of fog within the glass.

In a small glass cage set upon a pedestal of stone were several writhing grublike things that palpitated disgustingly. Squatting on its haunches directly across from Gary was a monstrosity with mottled skin and drooling mouth, with narrow, slitted eyes and slimy features. He fastened his pinpoint eyes upon the Earthman and Gary quickly looked away.

Nothing resembled mankind—nothing except the Engineers. Things that were terrible caricatures of the loathsome forms of Earth life, other things that bore not even the remotest resem-

blance to anything that mankind had ever seen or imagined.

Was this a fair sample of the intelligence the universe contained? Did he and Kingsley and Caroline appear as disgusting, as fearsome in the eyes of these other things as they appeared in his?

HE SHOT a quick glance at Caroline. She was listening intently, bent forward, her chin cupped in one hand, her eyes upon the Engineers. Just as well that way. She didn't see these other things.

The Engineer had stopped talking and silence fell upon the room. Then a new impulse of thought beat against Gary's brain . . . thought that seemed cold and cruel, thought that was entirely mechanistic and consciousnessless. He glanced swiftly around, trying to find who was speaking. It must be the thing in the glass sphere. He could not understand the thought. Just vague impressions of atomic structures and mathematics that seemed to represent enormous pressure used in the control of surging energy.

The Engineer was talking again.

"Such a solution," he was saying, "would be possible on a planet such as yours, where an atmosphere many miles in depth, composed of heavy gases, created the pressures that you speak of. While we can create such pressures artificially, we could not create or maintain them outside a laboratory."

"What the hell," asked Herb, "are they talking about?"

"Shut up," hissed Gary, and the photographer lapsed into shamefaced silence.

The cold, cruel thought was arguing, trying to explain something Gary could only guess at. He looked at Caroline, wondered if she understood. Her face was twisted into tiny lines of concentration.

The cold stream of thought had

stopped and another thought broke in . . . a little piping thought, perhaps the little sluglike creatures in the glass cage. Disgusting little things!

Gary looked at the mottled, droopy-mouth thing that squatted opposite him. It raised its head, and in the beady eyes he thought he caught a glimmer of amusement.

"By the Lord," he said to himself, "he thinks it's funny, too."

This arguing of hideous entities! The piping thoughts of slimy things that should be wriggling through some stagnant roadside ditch back on the planet Earth. The cold thought of the brain-blasting thing that lived on a planet covered by miles of swirling gases. The pin-point eyes of the thing with the mottled skin.

Cosmic Crusade! He laughed to himself, deep in his throat. This wasn't the way he had imagined it. He had thought of gleaming ships of war . . . of sounding bugles . . . of stabbing rays . . . of might arrayed against might . . . a place where courage would be on premium.

But there was nothing to fight. No physical thing. Nothing a man could get at. Another universe—a mighty thing of curving time and space. A man couldn't do anything about that.

"Cripes," Herb whispered to him, "this place is giving me the creeps."

## IX.

"WE can do it," said Caroline. She flicked a pencil against a sheet of calculations. "This proves it," she declared.

Kingsley bent over her shoulder and gazed at the sheet. "If you don't mind," he said, "would you lead me through it all again. Go slowly, please. I find it hard to grasp a lot of it."

"Kingsley," said Herb, "you're just an amateur. To get as good as she is you'd have to think for forty lifetimes."

"You embarrass me," she said. "It's simple. It's really very simple."

"I'll say it's simple," declared Tommy. "Just a little matter of bending time and space into a tiny universe. Wrapping it around a selected bit of matter and making it stay where you put it."

"You could use it to control the energy," rumbled Kingsley. "I understand that well enough. When the universes begin to rub you could trap the incoming energy in an artificial universe. The energy would destroy that universe, but you'd have another ready for it. What I can't understand is, how you form this artificial fourth-dimensional space."

"It isn't artificial," snapped Gary. "It's real . . . as real as the universe. But it's made by human beings instead of by some law we have no inkling of." He pointed at the sheet of calculations. "Perhaps the secret of all the universe is on that sheet of paper," he declared. "Maybe that's the key to how the universe was formed."

"Maybe," rumbled Kingsley, "and maybe not. There might be many ways to do it."

"One," said Gary, "is good enough for me."

"There's just one thing," said Caroline, "that bothers me. We don't know anything about the fifth-dimensional inter-space. We can imagine that its laws are different from our own. Vastly different. But how do they differ? What kind of energy would be formed out there? What form would it take?" She looked from one to the other. "That would make a lot of difference," she declared.

"It would," agreed Kingsley. "It would make a lot of difference. It would be like setting a trap for some animal. You might set one for a rat and catch a bear . . . or the other way around."

"The Hellhounds know," said

Tommy. "They know how to navigate in the inter-space."

"But they wouldn't tell us," said Gary. "They don't want the universe to be saved. They want it to be wrecked so they can build a new world out of the wreckage."

"It might be light, or matter, or heat, or motion, or it might be something that's entirely different," said Caroline. "It's not impossible it would be something else, some new, fearful form of energy with which we are entirely unacquainted. Conditions would be just as different out in inter-space as fourth-dimensional conditions differ from our three-dimensional world."

"And to be able to control it we should have some idea as to what it is," said Kingsley.

"Or what it would become when it entered the hypersphere," said Gary. "It might be one kind of energy out there, another kind within our universe."

"The people of the other universe don't seem to know," Tommy mused. "Even if they were the ones who found out about the universes drifting together. They don't seem to be able to find out much about it."

Gary glanced around the laboratory. A mighty vaulted room that glowed with soft, white light—a room with gleaming tiers of apparatus, with mighty machines, great engines purring with tremendous power, uncanny structures that almost defied description.

"The funniest thing about it," he declared, "is why the Engineers themselves can't make any progress. Why do they have to call us in? With all of this equipment, with the knowledge they already hold, it ought to be a cinch for them to do almost anything."

"THERE'S something damn queer here," Herb declared. "I've been snooping around a bit and this city is enough to set you batty. There isn't

any traffic in the streets. You can travel for hours and you don't see a single Engineer. No business houses, no theaters, nothing. And the buildings are empty. Without any furniture. Just empty buildings. A city of empty buildings." He puffed out his breath. "Like a city that was built and waiting for someone. Waiting for someone who never came," he explained.

Something akin to terror crossed Gary's mind. A queer, haunted feeling. A pity for those magnificent white buildings standing all untenanted.

"A city built for billions of people," said Herb. "And no one in it. Just a handful of Engineers. Probably not more than a few hundred thousand altogether."

Kingsley was clenching and opening his fists again, rumbling in his throat.

"It does seem queer," he said, "that they never found the answer. With all their knowledge . . . all their scientific apparatus."

Gary looked at Caroline and smiled. A wisp of a girl. But one, who could bend time and space until it formed a sphere—or rather, a hypersphere. A girl who could mold space as she wanted it, who could play tricks with it, make it do what she wanted it to do. She could set up a little private universe, a tiny replica of the universe—no one before, he was certain, ever had dared to think of doing that.

He looked at her again, a swift, sure look that saw the square-cut chin, the high forehead, the braided raven strands around her head. Was Caroline Martin greater than the Engineers? Could she master a problem they couldn't touch? Was she, all unheralded, the master mind of the entire universe? Did the hope of the universe lie within her mind?

It seemed impossible. And yet, she had thought of space and time for nearly forty lifetimes. With nothing but a brain to work with, with no tools, no

chance of experimentation—all alone, with nothing but her thoughts, she had solved the deep shrouded mysteries of space and time. Never dreaming, perhaps, that such knowledge could be used to such a purpose.

Metal feet scraped along the laboratory floor and Gary whirled to come face to face with Engineer 1824. The metal man had advanced upon them unaware.

His thought came to them, calm, unhurried thought, devoid of all emotion, impersonal, yet with a touch of almost human warmth.

"I heard your thoughts," he said, "and I am so afraid you might think I meant to hear them. But I am very glad I did. You wonder why the Engineers have brought you here. You wonder why the Engineers can't do this work unaided."

They stood guiltily, like schoolboys caught at some forbidden act.

"I will tell you," the thought went on, "and I hope you will understand. It is difficult to tell you. Hard to tell you, because we Engineers are full of pride. Conditions being different, we would never tell you."

It sounded like a confession, and Gary stared at the metal man in stricken surprise; but there was no sign of expression upon the metal face, no hint of thought within the glowing eyes.

"We are an old and tired people," said the Engineer. "We have lived too long. We have always been a mechanistic people and as the years went on we became even more so. We plod from one thing to another. We have no imagination. The knowledge that we have, the powers that we hold, were inherited by us. Inherited from a great race, the greatest race that ever lived. We have added somewhat to that knowledge but so very little. So very, very little when you think of all the time that has passed away since it was handed to us."

"Oh," cried Caroline and then put her hand up as if to cover her mouth, and

it clanged against the quartz of the helmet. She stared at Gary and he saw pity in her eyes.

"No pity for us, please," said the Engineer. "For we are proud and have a right to be. We have kept an ancient trust and kept it well. We have abided by the heritage that is ours. We have kept intact the charge that was given us."

IN THE LITTLE silence Gary had a sense of ancient things, of old plays played out upon a stage that had dissolved in dust these many thousand years ago. A sense of an even greater race upon an even greater planet. An old, old heraldry carried down through cosmic ages by these metal men.

"But you are young," declared the Engineer. "Your race is young and unspoiled. You have fallen into no grooves. Your mind is free. You are full of imagination and initiative. I sensed it when I talked to you back in your own System. And that is what we need . . . that is what we must have. Imagination to grasp the problem that is offered. Imagination to peer around the corner. A dreaming contemplation of what is necessary to be done . . . and then the vigorous initiative to meet the challenge that the dream may bring."

Again a little silence.

"That is why we are so glad to have you here," went on the Engineer. "That is why I know I can tell you what must be told."

He hesitated for a moment and a million fears speared at Gary's brain. Something that must be told! Something they hadn't known before. An even greater threat to face.

They waited breathlessly.

"You should know," said the Engineer, "but I almost fear to tell you. It is this: *Upon you, and you alone, must rest the fate of the universe. You are the only ones to save it!*"

"Upon us," cried Tommy. "Why, that is mad! You can't mean it!"

Kingsley's hands were clenched and the bearish grumble was rising in his throat. "What about those others?" he asked. "All those others you brought here, along with us?"

"I sent them back," declared the Engineer. "They were no help."

Gary felt the cold wind from space reach out and flick his face again. Man—and Man alone—stood between the universe and destruction. Little, puny Man. Man, with a body so delicate that he would be mashed into a bloody pulp, if exposed unprotected to the gravity of this monstrous world. Little Man, struggling toward the light, groping, groping, not knowing where he went.

And then the blast of trumpets sounded in the air—the mythical trumpets calling men to crusade. The ringing peal that for the last ten thousand years had sent Man out to war clutching at his sword.

"But why?" Kingsley was thundering.

"Because," said the Engineer, "we could not work with them. They could not work with one another. We could hardly understand them. Their process of intelligence was so unfathomable, their thought processes so twisted, that understanding was almost impossible. How we ever made them understand sufficiently to bring them here, I cannot understand. Many times we almost despaired. You see, their minds are so different from ours, so very, very different. Poles apart in thought."

Why, sure, thought Gary, that would be the way one would expect to find it. There was no such thing as parallel physical evolution—why should there be parallel thought evolution?

"Not that their thoughts weren't as valid as our thoughts," said the Engineer. "Not that they might not have an even greater grasp of sciences than we. But there could have been no co-ordination, no understanding sufficient

for us to work together."

"But," said Caroline, "we can understand your thoughts. You can understand ours. And yet we are as far removed from you as they."

The Engineer said nothing.

"And you look like us," cried Tommy. "We are protoplasm and you are metal, but we each have arms and legs—"

"It means nothing," said the Engineer. "Absolutely nothing." There was almost an edge of anger in his thoughts. "Don't you worry, old man," said Herb. "We'll save the universe. I don't know how in hell we'll do it, but we'll save it for you."

"Not for us," the Engineer corrected, "but for those others. For all life that now exists within the universe. For all life that in time to come may exist within the universe."

"There," said Gary, hardly knowing that he spoke, "is an ideal big enough for any man."

AN IDEAL. Something to fight for. A spur that kept Man going on, striving, fighting his way ahead.

Save the universe for that thing in the glass sphere with its shifting vapors, for the little wriggling sluglike things, for the mottled monstrosity with the droopy mouth and he glint of humor in its eyes.

"But how?" asked Tommy. "How are we going to do it?"

Kingsley ruffled at him. "We'll do it," he thundered.

He wheeled on the Engineer. "Do you know what kind of energy would exist within the interspace?" he asked.

"No," said the Engineer. "I cannot tell you that. Perhaps the Hellhounds. But that's impossible."

"Is there any other place?" asked Gary in a voice cold as steel. "Anyone else who could tell us?"

"Yes," said the Engineer. "There is one other race. I think that they might tell you. But not yet. Not yet. It is too dangerous."

"We don't care," said Herb. "We humans eat up danger."

"Let us try," said Gary. "Just a couple of us. If something happened, the others would be left to carry on."

"No," said the Engineer, and there



"The Earth!" Gary cried.

"Yes—the Earth. But not as it is—as it may be a million years hence!"



was a terrible finality in the single thought.

"Why can't we go out ourselves and find out?" asked Herb. "We could make a little universe just for ourselves. Float right out into this fifth-dimension space and study the energy that we find."

"Splendid," purred Kingsley. "Absolutely splendid. Except there isn't any energy yet. Won't be any until the two universes rub and then it will be too late."

"Yes," said Caroline, smiling at Herb, "we have to know before the energy is produced. When the universes rub, it will flood in upon us in such great quantity that we'll be wiped out almost immediately. The first contracting rush of space and time will engulf us. Remember, we're just inside the universal rim."

"I do not entirely understand," said the Engineer. "You spoke of making a universe. Can you make a universe? Bend space and time around a predetermined mass? I am afraid you jest. That would be so very, very difficult."

Gary started. Was it possible that Caroline had done something an Engineer thought impossible to do? Standing here it seemed so simple, so commonplace that space-time could be bent into a hypersphere. Nothing wonderful about it. Just something to be slightly astonished at and argue about. Just a few equations spread upon a sheet of paper.

"Sure, we can," bellowed Kingsley. "This little lady has it figured out."

"The little lady," commented Herb, "is a crackjack at figures."

The Engineer reached out his hand to take the sheet of calculations that Kingsley was handing to him. But as he reached out his arm little red lights began to blink throughout the laboratory and in their ears sounded a shrill, high-pitched whine—a whine that held a note of sinister alarm.

"What's that?" yelled Kingsley, dropping the sheet.

The thought of the Engineer came to them as calm as ever, as absolutely devoid of emotion as it had always been. "The Hellhounds," he said. "The Hellhounds are attacking us."

As he spoke Gary watched the sheet of paper float down to the floor, a little fluttering sheet that held the key to the riddle of the universe scratched upon it in the black scrawling of a soft-lead pencil.

The Engineer moved across the laboratory to a panel. His metallic fingers reached out, deftly punched at studs. A wall screen lighted up and on it they saw the bowl of sky above the city. Ships were shooting up and outward, great silver ships that had grim lines of power about them. Up from the roofs they soared and arrowed out toward space, squadron after squadron, following a grim trail to the shock of combat. Going out to meet the Hellhounds.

The Engineer made adjustments on the panel and they were looking deeper into space, far out into the blackness where atmosphere had ended. A tiny speck of silver appeared and rapidly leaped toward them, dissolving into a cloud of ships. Thousands of them. "The Hellhounds," said the Engineer.

Gary heard Herb suck in his breath, saw Kingsley's hamlike hands clenching and unclenching.

"Stronger than ever," said the Engineer. "Perhaps with new and more deadly weapons . . . perhaps more effective screens. I am afraid, so very much afraid, that this means the end of us . . . and of the universe."

"How far away are they?" asked Tommy.

"Only a few thousand miles now," said the Engineer. "Our alarm system warns us when they are within ten thousand miles of the surface. That gives us time to get our fleet out into

space and meet them."

"Is there anything we can do?" asked Gary.

"We are doing everything we can," said the Engineer.

"But I don't mean you," said Gary. "Is there anything the five of us can do? Any war service we can render you?"

"Not now," said the Engineer. "Perhaps later there will be something. But not now."

He adjusted the screen again and in it they watched the defending ships of the Engineers shooting spaceward, manœuvered into far-flung battle lines—like little dancing motes against the black of space.

In breathless attention they kept their eyes fixed on the screen, saw the gleaming points of light draw closer together, the invaders and the defenders. Then upon the screen they saw dancing flashes that were not reflections from the ships, but something else—knifing flashes that reached out, probed and swung, like a searchlight cuts into the night. A tiny pin point of red light flashed momentarily and then went out. Another flamed, like lightning bugs of a summer night, except the flash was red and seemed filled with terrible violence.

"Those flashes," breathed Caroline. "What are they?"

"Exploding ships," said the Engineer. "Screens broken down, energy drained out, an atomic bomb or ray finds its way to them. It is so very, very sad."

"Exploding ships," said Gary. "But whose?"

"How can I tell?" asked the Engineer. "It may be theirs or ours."

And even as he spoke a little ripple of red flashes ran across the screen.

## CHAPTER X.

HALF THE CITY was in ruins, swept and raked by the stabbing rays that probed down from the upper reaches

of the atmosphere, blasted by atomic bombs that exploded with a screeching roar that shook the very bedrock of the planet and shattered the great, sky-high towers of white masonry into drifting dust. Twisted wreckage fell into the city from the battle area, great battle cruisers reduced to grotesque metal heaps, bent and battered out of all semblance to a ship, burned and scorched by lashing heat rays, crushed and flattened by the energy unloosed in the height of battle.

"They have new weapons," said the Engineer. "New weapons and better screens. We can hold them off a little longer. How much longer I do not know."

In the laboratory, located in the base of one of the tallest of the skyscrapers of the great white city, the Engineer and the Earthlings had watched the battle for long hours. Had seen the first impact of the fleets, had watched the dog fight out at the edge of atmosphere, had witnessed the Hellhounds slowly drive the defenders back, until the invaders were within effective bombardment distance of the city itself.

"They have a screen stripper," said the Engineer, "that is far more effective than anything I have ever seen. It is taking too much of our ships' energy to hold up the screen under this new weapon."

In the telescopic screen a brilliant blue-white flash filled all the vision-plates as an atomic bomb smashed into one of the few remaining towers. The tower erupted with the flash of light and seemed to disappear, with merely a ragged stump of masonry bearing testimony to its once sky-soaring height.

"Isn't there any one who can help us?" asked Kingsley. "Surely there is someone to whom we might appeal."

"There is no one," said the Engineer. "We are alone. For thousands of light-years there are no other great races to be found. For millions of years the

Hellhounds and the Engineers have fought, and it has always been those two and just those two alone. Thus it is now. Before, we have always driven them off. Many times have we destroyed them almost to the point of annihilation that we might hold their cosmic ambitions under proper check. Now it seems they will be the victors."

"No other race," said Gary, musing. "Not for thousands of light-years." He stared moodily at the screen, saw a piece of twisted wreckage, a thing that had at one time been a ship, crash into the stump of broken tower and hang there, like a bloody, smoke-blackened offering tossed on the altar of war. "But there is," he said. "There is at least one great race very near to us."

"There is?" asked Caroline. "Where?"

"On the other universe," said Gary steadily, calmly. "A race that is fully as great, as capable as the Engineers. A race that should be happy to help us in this fight."

"Great suffering snakes," yelled Herb, "why didn't we think of that before?"

"I do not understand," said the Engineer. "I agree they are a great race and very close to us. Much, much too close. But they might as well be a billion light-years away. They can do us no good. How would you get them here?"

"Yes," rumbled Kingsley, "how would you get them here?"

Gary turned to the Engineer. "You have talked to them," he said. "Have you any idea what kind of people they might be?"

"A great people," said the Engineer. "Greater than we in certain sciences. They were the ones who notified us of the danger of the approaching universes. They knew they were nearing our universe when we didn't even know there was another universe besides our own. Such very, very clever people."

"Talk to them again," said Gary. "Give them the information that will enable them to make a miniature universe—one of Caroline's hyperspheres."

"But," said the Engineer, "that would do no good."

"It would," said Gary grimly, "if they could use the laws of space to form a blister on the surface of their universe. If they could go out to the very edge of the space-time frame and create a little bubble of space—a bubble that would pinch off, independent of the parent universe and exist independently in the five-dimension interspace."

Gary heard the rasp of Kingsley's breath in his helmet phones.

"They would cross to our universe," rumbled the scientist. "They could navigate through the interspace with complete immunity."

Gary nodded inside his helmet. "Exactly," he said.

"Why, Gary," whispered Caroline, "what a thought!"

"Boy," said Herb, "I'd like to see them Hellhounds when we sick those fellows on them."

"Maybe," said Tommy, "they won't come."

"I will talk to them," said the Engineer.

He left the room and they followed him through a mighty corridor to another room filled with elaborate machinery.

THE ENGINEER strode to a control panel and worked with dials and studs. Intense blue power surged through long tubes and flashed in dizzy whirls through coils of glass. Tubes boomed in sudden brilliance and the deep hum of power surged into the room.

They could hear the probing fingers of the Engineer's thought, thrusting out, calling, calling to those other things in another universe. The power of thought being hurled through the very warp

and weave of twisted space and time.

Then came another probing thought, a string of thoughts that were impossible to understand, hazed and blurred and all distorted. But apparently perfectly clear to the Engineer, who stood motionless under the inverted cone of glass that shimmered with blue fire of power.

Two entities talking to one another and the queer, challenging, unknown of five-dimensional interspace separating them!

The power ebbed and the blue fire sank to a glimmer in the tubes.

The Engineer turned around and faced the Earthlings.

"They will come," he said, "but only on one condition."

Suddenly a shiver went through Gary. Condition! That was something he hadn't thought about. That these other things might exact terms, that they might want concessions, might seek to wring from another universe some measure of profit for a service done.

He had always thought of them as benevolent beings. Entities like the Engineers—living a life of service, establishing themselves as guardians of their universe. But that was it. Would they go out of their way to save another universe? Or would they fight only for their own? Was there such a thing as selflessness and universal brotherhood? Or must the universes, in times to come, be forever at one another's throats, as in ancient times nations had torn at one another in savage anger, in more recent times planets had warred for their selfish interests?

"What conditions?" asked Kingsley.

"That we or they find something concerning the nature of the interspace and of the energy which will be generated when the universes rub," said the Engineer. "They are willing to come and fight for us, but they are not willing to deliberately invite disaster to themselves. No one knows what the interspace is

like. No one knows what laws of science it may hold. They may be laws that are utterly foreign to us. Laws that would defy our every bit of knowledge. They are afraid that the budding of a smaller universe from the surface of their own might serve to generate the energy they know will result when two four-dimensional frames draw close to one another."

"Now, wait," said Gary. "There is something I didn't consider when I proposed this thing. It just occurred to me now. When you said the word 'condition' it came to my mind that they might want concessions or promises. I was wrong—interpreted the thought wrong. But the idea is still there. We don't know what these things in the other universe might be. We don't know what they look like or what their philosophy is or what they can do. If we allowed them to come here, we'd be giving them a key to this universe. Just opening the door for them. They might be all right and they might not. They might take over the universe."

"There's something to that," said Tommy. "We should have thought of it before."

"I do not believe it," said the Engineer. "I have some reason to believe that they would not be a menace to us."

"What reason?" rumbled Kingsley.

"They notified us of the danger," said the Engineer.

"They wanted help," said Tommy.

"We have been of so little help to them," said the Engineer.

"What difference does it make?" asked Herb. "Unless we can do something about this energy, we are going to be goners, anyhow. And that goes for the other universe as well. If they could save themselves by ruining us, maybe they'd do it, but it's a cinch that if we puff out they go along with us."

"That's right," agreed Kingsley. "It would be to their interest to help us beat off the Hellhounds on the chance

that we might find something to save the universes. They wouldn't be very likely to turn on us until somebody had figured out something about this energy."

"And we can't control something we don't understand," said Caroline. "We have to find out what that energy is, what it's like, what form it is apt to take, something about it, so we will know how to handle it."

"How much more time have we to

hard to reach. Perhaps impossible to reach."

"LISTEN," said Gary, "it's our only chance. We might as well get killed going to them as waiting here for the energy to come and wipe us out. Let a couple of us try. The others may find something more before it is too late. Her hyperspheres might take care of it, might control the energy, but we can't be sure. And we have to be sure.



find some way to save us from the big explosions?" asked Gary.

"Very little time," said the Engineer. "So very, very little time. We are perilously close to the danger point. Shortly the two space-time frames of the two universes will start reacting upon one another, creating the lines of force and stress that will set up the energy fields in the inter-space."

"And you say there is another race that can tell us about this inter-space?"

"One other race I know of," said the Engineer. "There may be others, but I know only of this one. And it is so very

The universe depends upon us being sure. We can't just shoot in the dark. We have to know."

"And if we find out," said Herb, "those guys in the other universe can come over and help us hold the Hell-hounds off while we rig up the stuff we have to have."

"I'm afraid we have to take the chance," said Kingsley.

"Chance," said the Engineer. "It's more than chance. The place I have in mind may not even exist."

"May not even exist?" asked Caroline, and there was something very close to terror in her words.

"It is so far away," said the Engineer. "Not far in space. Perhaps very close to us in space—but so far away in time."

"In time?" asked Tommy. "Some great civilization of the past?"

"No," said the Engineer. "A civilization of the future. A civilization which may never exist. One that may never come to be."

"How do you know about it then?" flared Gary.

"I followed its world line," said the Engineer. "And yet not its actual world line, but the world line that was to come. I traced it into the realm of probability. I followed it ahead in time—saw it as it is not yet, as it may never be. I saw the shadow of its probability."

Gary's head reeled. What talk was this? Following of probable world lines. Tracing the course of an empire before it had occurred! Seeing a place that might not ever exist. Talking of sending someone to a place that might never be!

But Caroline was talking now, her cool voice smooth and calm, but with a trace of excitement tinging the tenor of her words.

"You mean you used a geodesic tracer to follow a world line into a realm of probability. That you established the fact that in some future time a certain world may exist under such conditions as you saw. That barring unforeseen circumstances it will exist as you saw it, but that you cannot be certain it will ever exist, for the world line you traced could not take into account that factor of accident which might destroy the world or divert it from the path you charted."

"That is correct," said the Engineer. "Except for one thing. That the world will exist as I saw it in some measure. For all probabilities must exist to some extent. But its existence might be so tenuous that we could never reach it—

that for us it would have no real existence. In other words we could not place foot upon it. For every real thing there are infinite probabilities, all existing, drawing some shadow of existence from the mere fact that they are probable or have been probable or will be probable. The stress and condition of circumstance selects one of these probabilities, makes it an actuality. But the others have an existence just the same. An existence, perhaps, that we could not perceive."

"But you did see this shadow of probability?" rumbled Kingsley.

"Yes," said the Engineer, "I saw it very plainly. So plainly that I am tempted to believe it may be an actuality in time to come. But of that I cannot be sure. As I said, it may not exist, may never exist—at least to an extent where we could reach it—where it would have any bearing on our lives."

"There is a chance, though, that we could reach it?" asked Gary.

"Yes," said the Engineer, "there is a chance."

"Then," said Herb impatiently, "what the hell are we waiting for?"

"But," said Gary, "if the universe is destroyed, if we should fail and the universe be destroyed, would that probability still be there? Wouldn't the fact that you saw it prove that we will find some way to save the universe?"

"It proves nothing," said the Engineer. "Even were the universe destroyed the probability would still exist, for the world *could have been*. Destruction of the universe would be a factor of accident which would eliminate actuality and force all lines of probability to remain mere probability."

"You mean," breathed Caroline, "that we could go to a world which exists only as a probable world line and get information there to save the universe—that even after the universe is destroyed, if we fail and it is destroyed, the information which might have saved



it still could be found, but too late to be of use, on that probable world?"

"Yes," said the Engineer, "but there would be no one to find it then. The solution would be there, never used, at a time when it would be too late to use it. It is so hard, so very hard to explain it as it should be explained."

"Maybe it's all right," said Herb, "but I crave action. When do we start for this place that might not be there when we get where we headed for?"

"I will show you," said the Engineer.

THEY FOLLOWED him through a maze of laboratory rooms until they came to one which boasted only one piece of equipment, a huge polished bowl that blazed with reflected light from the single bulb that shone in the ceiling above it.

The Engineer indicated the bowl.

"Watch," he told them.

He walked to a board on the wall opposite and swiftly set up an equation on a calculating machine. The machine whirled and clicked and chuckled and the Engineer depressed a series of studs in the control board. The inside of the bowl clouded and seemed to take on motion, like a gigantic whirlpoint of moving nothingness. Faster and faster became the impression of motion.

Gary found himself unable to pull his eyes away from the wonder of the

bowl—as if the very motion were hypnotic.

Then the swirl of motion began to take form, misty, tenuous form, as if they were viewing a strange Solar System from a vast distance. The Solar System faded as the vision in the bowl narrowed down to one planet. Other planets flowed out of the picture and the one grew larger and larger, a ball swinging slowly in space. Then it filled all the bowl and Gary could see seas and cities and mountains and vast deserts. But the mountains were not high, more like weathered hills than mountains, and the seas were shallow. Desert covered most of the spinning globe and the cities were in ruins.

There was something tantalizingly familiar about that spinning ball—something that struck a chord of memory—something about the Solar System—as if he had seen it once before.

And then it struck him like an open hand across his mouth.

"The Earth!" he cried. "That is the Earth!"

"Yes," said the Engineer, "that is your planet . . . but you see it as it will be many millions of years from now . . . an old, old planet . . ."

"Or as it may never be," whispered Caroline.

"You are right," said the Engineer. "Or as it may never be."

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# TOWARD THE SUPERMAN

BY RICHARD TOOKER

*Headed for the superman—! We plan our beasts and grow them by genetic breeding. Why not plan our supermen and breed them? Fine! But—which of these is the superman?*



SO successful have been man's experiments in scientific breeding in producing better animals and plants, it appears only logical that the same methods should be applied to produce better men. Not only in science-fiction has this been proposed, but in the world in general it has a considerable following.

Appearances are deceiving. Man's scientific breeding has produced some of the most remarkable monstrosities—certainly the largest number of coexistent monstrosities—the world has ever seen. The modern milk cow is an outstanding success of the breeders. As a



cow, it is undoubtedly a success. As an animal, it is a remarkable monstrosity, an evolution gone haywire in a large way.

The modern dairy cow might be defined as a biologicico-chemical machine supplied with self-contained motive power sufficient to move the biochemical reduction apparatus to its raw material. This mobile reduction plant has driving apparatus about thirty percent efficient—comparable with our best Diesel engines—sufficient neuro-relays to perceive and find food, an excellent grinding mill to reduce it to usable form, and a highly efficient converter apparatus

to change cellulose to sugars and proteins in an easily digestible, suspension form.

As an animal, it's a failure. It eats all day long, and its ribs always show; all the food energy drains away in milk. To avoid any loss of time, its nervous system has been reduced to a state where it doesn't really know how to be afraid. If it saw a wolf, it might lose two bites before returning to its food. Certainly, if it did get an inspiration from some carefully buried instinct and try to run, it wouldn't move a dozen feet before the wolf caught it. The milk apparatus gets in the way.

As an animal, it's a monstrosity that



The Cow—as Nature designed it. A savage, tough-muscled, deadly fighter, well able to defend itself against wolves, a beast that even the lion and tiger treat with fearful respect. But it gives practically no milk. The wild cow is far more dangerous game for even well-armed men than is the lion.

has not sufficient evolutionary value to exist. The same might be said of St. Bernards, Pekingese, Irish wolfhounds and bulldogs. Man's breeding methods are remarkably efficient—if *some particular, simple characteristic is sought*.

There's another thing that stands in our way if we want to breed supermen, so far as the simple, one-track, breed-toward-a-given-characteristic method is considered. What do you want? Tall men, short men, heavy men, six-fingered men, men with tails, or men with swivel eyes? Or do you think blond brutes are best, even though they blister their nonsun-proof hides off in the tropics? Or dark-skinned, sun-proof men that die for lack of ultraviolet north of 45° N. unless artificially nurtured?

Big brains, perhaps? Better find out a little about brains, first, inasmuch as Newton had an unusually small one, and a London mechanic had one of the largest on record. His one claim to fame.)

How far do you suppose the Interjungle Congress of Apes might have gotten in designing the super-ape? We're omnivorous, which is useful to a race that insists on living in such uninhabitable places as the arctic regions, and subsists on anything from grass to

fried caterpillars or seal blubber and walrus blood. But the almost purely vegetarian apes would have viewed such a suggestion as breeding a meat-eating super-ape much as we'd view the suggestion that supermen would be much better off if designed to eat their dead instead of cluttering up good land with them.

We wouldn't, in other words, make suitable designers of a race we intend to be superior to our own. As men, we can see what things in our evolution were advantageous to men; as men, we would not have superhuman foresight to lay down plans for our betters.

THERE IS another manner of improving a race or a type, however, which does not involve that type of planning. Evolution's survival-of-the-fittest method is a modified application of it. We can prevent deterioration of a present stock by forbidding the reproduction of definitely undesirable traits—criminality, excessive nervous instability—insanity, it is now believed by many authorities, is not inheritable any more than cancer is; predisposition to insanity, like the susceptibility to cancer, is, however.

Finally, there is the distilled essence of this method of operation in the more recent breeding experiments applied to plants; inbreeding of the harshest kind.

But all these methods—selection to—



The Cow—as Man designed it. A helpless, defenseless monstrosity, unable to live beyond Man's care. Slow and stupid, it would be dead in a day in the open competition of the wild. But it gives gallons of milk.



The Dog—as Nature meant it. The typical wild dog—coyote, Australian Dingo, etc.—is about the size of a large Airedale, with a short, rough, yellowish coat. It's sly, intelligent, quick to learn the ways and dangers of men, a canny hunter, and a long-distance runner.

ward a desired characteristic, lopping off of undesirable strains, inbreeding to the point where weakness kills weakness by addition—have one common and unchangeable flaw. All depend on selection of the units of heredity—the genes—*already existent* in the germ plasm of the organism we're working on. Genetics, *per se*, is the manipulation of *existent* characteristics to amplify some one of them. It will not produce characteristics that don't already exist.

That is, if the Aesthetic Department of the Applied Eugenics Control Board should decide that all men should have green hair, and all women bright-blue hair, they would not get it by any manner of selection, inbreeding, or elimination. Green and blue are not hair colors present in human heredity now. They aren't even present in the mammalian stock. They could select from now to the other side of doomsday, and they still wouldn't get something that wasn't there to begin with.

Mutation is required. The blending of characteristics that determine the new individual is brought about by shuffling the determining factors that make up the germ plasm. There's one determiner unit that means blue eyes, one for red hair, one for black hair, one for a long nose. Shifting them won't change them. But if an X-ray quanta

happens to lodge in the middle of a red-hair determinant and explode its energy, the red-hair determiner probably will cease to be just that; it might turn into a blue-hair determiner. That would be a mutation.

It's possible, of course, that a bomb landing in the middle of a jigsaw puzzle might blow it up and let the pieces fall back into such a pattern as to make another perfect picture. It's most prob-



Dogs—as Men redesigned them. Admittedly extreme specimens of Man's ideas of what a better dog should be. The St. Bernard is a giant dog because of hereditary glandular malfunction. The bulldog is a type of glandular dwarfism. Neither could successfully face life without Man's care. Neither could fight the coyote and live. But they make grand pets!

The Pekingese is, perhaps, the ultimate extreme in evolutionary monstrosities. Though small, these dogs have unbounded courage—which, to evolution's harsh way, is fatal misjudgment. A Pekingese has been known to make an unprovoked attack on an Irish Wolfhound, largest and most powerful of all the Dog family! They have courage beyond their size—bred in by Man. Nature would teach them judgment—or death.

able that it would simply shatter the thing permanently, or that the pieces fall back in a senseless, meaningless array.

It's possible that a red-hair determiner should get blown up and reassemble to a blue-hair unit. It's more probable that it would simply die, or repair itself to a senseless, meaningless bit of scar tissue. When that sort of thing happens, it generally happens to a more important determiner, so that the intestines, perhaps, aren't formed sensibly, and the offspring can't possibly live. Or the heart neglects to form. Or it produces an infant possessed of an extra arm, or double knee joints. Mutations are not extremely rare; sensible, useful mutations are.

Mutation can be caused by X rays, or by any other thing that badly, almost but not quite fatally, injures the germ cell. Heat, extreme cold, cosmic rays, radium rays, strong chemical attack, mechanical injury—a thousand things.

The superman must be a mutation, then, if he is to have any capability man does not have. Mutation cannot be controlled—at least, not at present, nor for a long time to come, probably. Visualize the difficulty of intelligently changing layout plans so complete that they determine not only general body form, but details such as a cleft chin, fine or coarse hair, a quirk of mental reaction, a characteristic gesture, even, all wrapped up and fixed in a bit of living stuff less than a thousandth of an inch in diameter. The structure of an atom is the essence of simplicity, beside that!

WE CAN'T, then, get the true superman by controlled breeding of human material. But how about genuine improvements possible to our present type of humanity? Is that practicable?

Plant and animal alike have a similar basic method of reproduction; rules that work with plants, work with animals—and man is an animal. One of the

outstanding successes of recent breeding experiments has been performed with corn. Normal, good corn plants were bred *to themselves*, possible since the corn tassel is male, and the silk is female within one plant. That tended to concentrate the heredity of any individual plant. Carried on for several generations, the healthy, hardy corn-plant original produced fewer and fewer viable seed, the seed produced scrawnier and weaker plants, and most of those died. They fell before a gust of wind, due to stalk weakness. They uprooted, due to defective roots. They wilted under blight, and crumpled when rains didn't come at the perfect time.

Every trace of the original weaknesses, present in any heredity, compounded and added. Weak root tendencies added to weak stalks and the plant fell. Blight susceptibility added to lack of drought resistance to make it die at the first light touch of blight under drought conditions, or rot when the rains came too heavily.

The final product was a sorry spectacle. Stunted, twisted, unhealthy, scarcely capable of making seed after generations of this total inbreeding.

Then they were outbred, lines crossed.

The product was corn that blasted its way up to huge, deep-rooted, tough-stalked plants that blight couldn't even inconvenience. It thrived on drought, and grew heartily with water-soaked roots. Why not? If those final inbred plants lived at all, it showed that nearly every weakness had been eliminated by mutual destruction. They must have represented nearly pure strong, resistant strains. Given half a chance, outbred again, they bred immensely sturdy, resistant plants—and bred true to that new, sturdy type.

Had the law limited these geneticists to outbreeding, they quite probably would have thrown up their hands in despair. On occasion, Luther Burbank sought the world over for just one speci-

men having a trait he desired to develop. And when he found such a specimen, the process that followed demanded a preponderance of inbreeding to accentuate the desired trait until a species breeding true was developed. Then, and then only, could some outbreeding be cautiously introduced without danger of losing what had been gained.

Peter Chalmers Mitchell, of the London Zoölogical Society, states the proposition in a nutshell when he writes, after reviewing our entire genetic history: "It follows that if there is much in-and-in breeding, the weight of mediocrity will be less and the peculiarities of the breed accentuated."

It is these "peculiarities of the breed" that the geneticist concentrates on in creating a new and better species. Reducing "the weight of mediocrity" in mankind ought to be the whole purpose of eugenics, yet on grounds of the results achieved with plants, our mediocre average man cannot be appreciably improved without deliberate inbreeding somewhere in the process.

Professor R. C. Punnett of Cambridge University, perhaps no less a world authority in English than Mitchell, concludes his survey of Mendelism with these words: ". . . if, also, man decides that his life shall be ordered in the light of this knowledge, it is obvious that the social system will have to undergo considerable changes."

WHY IS IT necessary that the social system be changed if a superman is to be bred by scientific methods? What else than the fact that genetics demands inbreeding in its processes as well as scientific selection of mate choice as opposed to sentimental selection by the mates themselves?

Fully to appreciate the impassable barrier to a better average stock of man on the present basis of eugenics, we cannot overlook the pages of evolution's history in nature, keeping foremost in

mind at all times that nature breeds for survival, and not for specific purpose merely, and that man, if bred scientifically, must be bred to survive his mechanical environment first of all. Nature has produced no super milk cows—but it has produced water buffalo that even tigers fear.

In the early days of stock raising in northern Arizona, the ranchers admired and coveted the speed, stamina and general hardihood of the wild-horse herds, which were descended by natural selection from the original, imported Spanish stock, dating from the conquest of Mexico by Cortez. But the wild horses, on the average, were too small to carry a man in saddle all day, and, of course, were too light for draft purposes. Some of the ranchers conceived the idea of crossing the small, wild horses with large, thoroughbred breeds, thus producing a large breed of horses that retained the speed and toughness of the wild horse.

To accomplish this wholesale, they turned loose huge, thoroughbred stallions, believing these monsters would speedily kill or drive away the small wild stallions that were siring the wild mares. But to their amazement a nine-hundred-pound wild-horse stallion not only could whip, but could kill, a thoroughbred stallion more than twice his weight, even the champion fighters among the "steeldust" breeds!

The significance of this as regards genetics is that the wild-horse herds were all notoriously inbred. Referring to Professor Mitchell, we recollect that in-and-in breeding reduces "the weight of mediocrity" and "the peculiarities of the breed are accentuated." In the case of the wild horses, the peculiarity of the breed that nature preserved was, in a word, *survival*, tremendous and miraculous vitality of a race to live for its own sake, and for no secondary utility in the slavery of a higher species.

What was true in the case of the



wild horses, is true of almost all wild life in the natural state. On the one hand, inbreeding produces defectives by inheritance concentrates—but, on the other, it produces super-types by the same accentuation of peculiarities. In the wild state, defective offspring are devoured by predatory beasts or die of starvation before they are able to propagate. Thus, the germ plasm is purged of defective gametes and the super-types rise to the ultimate of perfection in species survival in adjustment to a given environment. By this process, wild animals breed to extreme hardihood. As the small, wild horse can outsurvive the large domesticated stallion, so a wolf can kill a hound, a bobcat prevail against a house cat, and a wild man outlive our civilized variety. But inbreeding also accentuates desirable domestic traits, though usually at the expense of the capacity to survive alone and unaided.

NOT QUITE a century ago, the first thoroughbred Percheron horses were imported from France. Today, more than 229,000 Percherons are registered in the stud books of the Percheron Horse Association in Chicago. It stands to reason that the line of descent for our thoroughbred Percherons must reveal considerable inbreeding. Otherwise the valued traits could not have been perfectly preserved.

As we ascend the biological planes from plant to beast and from beast to man, the problems of genetic breeding grow more and more complex. Man, at the peak, must breed for reasoning power and nervous stability as well as for efficient muscularity and enduring constitution. To illustrate the complexity of the human problem, we may cite the fact that every human individual in the tenth generation has 1,024 tenth grandparents. In varying proportions, he may inherit all or any of the traits of these numerous ancestors. It is readily apparent how difficult it

would be to breed out a defect in an ancestral line by outbreeding, or even distant inbreeding. For outbreeding simply perpetuates *all* traits and achieves a slightly variable mediocrity.

Our genetic records clearly reveal how modern man breeds back and forth to a standard of mediocrity. Fathers of 72-inch stature has sons of an average stature of 70.8 inches. But fathers of 66-inch stature have sons of an average stature of 68.3 inches—moving back toward normal, which is just another word for mediocrity. It is only logical to conclude that if height varies in this way from just above to just below average, then mentality, nervous stability and disease immunity probably varies above and below normal in the same way.

There has been considerable comment recently on the fact that the younger generation of men are taller than their fathers, and some maintain they are smarter than their fathers as well. The geneticist sees nothing remarkable in this—for he knows that the sons of this younger generation will be inevitably shorter, and, if we grant the premise—an entirely possible one, by the way—less intelligent than their fathers.

THE MAINTENANCE of this mediocre level in breeding mankind is obviously due, to a large extent, to a compulsory preponderance of outbreeding. We have, of course, considerable inbreeding in certain localities—Martha's Vineyard, Point Judith, Block Island, the North Carolina "Banks," to name a few. But for genetic purposes the degrees are actually too distant, if it were not certainly true that unsupervised inbreeding, without the natural purges of nature, tends certainly to degeneracy. Like strychnine, inbreeding is a valuable curative in trained, supervised hands, and deadly poison otherwise.

Aside from the social obstacle to inbreeding, there is the important eco-

nomie factor. Since eugenics enthusiasts and experimental subjects might be found, we can, for the purposes of this argument, overlook the sentimental obstacles. Evidently, the process would be applied to a selected colony or group, and not to the people as a whole. Now let's investigate the standing of such a colony from the economic viewpoint.

On the basis of results with corn—even though, evidently, such direct inbreeding is not possible with humans—we would rapidly find an increase of useless defectives. It would take several generations to attain that weakness-killing-weakness state that the inbred corn manifested. With the less-intense inbreeding possible to man, it would take even more generations.

And, characteristically, the inbred lines are defective. They would constitute a population of morons, dwarfs,

chronically sick, tubercular, and sterile misfits. Most of them would die in infancy; many would die before adolescence. Few would live long enough to reach mating age. Of those, most would be sterile. And all would be helpless, useless beings to be cared for by sounder men and women. Our eugenics colony would be a colony of human tragedy, unbearable, and not worth its cost in either the economic sense or in human suffering. The method most useful in plants cannot be used with men in the same wholehearted manner.

A judicious combination might be practicable. But man's breeding methods so far have consisted of breeding toward a desired, predetermined character. We know too little now to attempt that; the elimination of unfit, on the other hand, is a more reasonable and more usable step.

### BREEDING FOR SIZE

The size of an individual animal may be said to depend on three factors: its normal, hereditary size-limitations, its glandular functioning, and its food supply. Thus, in Man, there are normal inherited size variations from about 4.5 feet to about 6.25 feet. Within that range, physiologically normal men are found; beyond those limits, one or more of the other, abnormal determining factors enters. Thus starvation may reduce a potential, inherited size-possibility to an actually realized height some inches shorter. Glandular malfunction may reduce it farther, even down to 24 inches, or, on the other hand, increase a normal size-potentiality to 8.5 feet.

A St. Bernard dog is a victim of an inherited glandular malfunction. The loose, flabby skin, general tendency to awkwardness, overlarge feet and lips indicate this. Great Danes are, too, glandular giants. A cross between these two breeds results in hybrid pups that, almost invariably, develop a paralysis of the hind legs.

A bear, on the other hand, is a member of the same group of animals as the dog, wolf, etc., but its huge size is due to a true mutation; the animal was designed by Nature to have that size, and is engineered for it, throughout. A man 8 feet and more in height is almost invariably so weak and clumsy that he can barely move around—never actively.



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# STAR CRASH



BY KENT CASEY

## STAR CRASH

*A hard-boiled sergeant learns to dance—and to value a good man.*

A LITTLE knot of men sprawled comfortably on the port forward fin of the space ship *Beagle*, smoking and watching the winking lights of San Francisco across the bay. Private Kelton, his back against the bulge of a sponson, twanged lustily on a banjo and caroled to the stars:

*"Oh, we're bound away at break of day  
Where the cream lies thick on the Milky  
Way;  
We've gotta get Taurus a bale of hay,  
So burn, rocket, burn!"*

Captain Carroll, pacing the catwalk above the shining hull with his executive, smiled. "Listen," he said. "That man is about as dependable as a cracked stanchion, but he's the best morale builder on this ship. The whole crew is worried about this cruise—but he's making a frolic of it."

Commander Stoney took his pipe out of his mouth. "What is this expedition, captain—if that isn't too much to ask? The ship is stocked up for a good two years, and it's an open secret that every married man aboard has been detached. All bachelors, and all comparative old-timers—not a man with less than three years behind him in the entire complement. I don't wonder the men are worried a bit. I'm puzzled myself."

Captain Carroll flipped the stub of his cigar over the side. "It's that binary star in Lyra the astronomers are so excited about," he answered shortly.

"Lyra 2488?" Stoney asked. "What is there about a binary star to get charged up about? There's millions of 'em."

"Ye-es. But did you ever hear the theory of how planets are made? An

intruder smashing one of a binary pair?"

"You mean that the planets—ours, for instance—were once all together in a twin sun to Sol?"

"That's the idea. They think probably a wandering star got close enough to one of a binary and smashed it. The chunks had enough angular velocity to keep revolving about the surviving sun and gradually shrank down to be planets."

"I see. But what has Lyra 2488 got to do with it?"

"We-ell, Lyra 2488 is dead in the track of a rogue. The chances are good that there'll be a collision in about eight more months. And the Smithsonian wants pictures of the crash. So we are going to get the pictures."

Stoney stopped dead and stared at his commanding officer. "Sweet singin' Cygnus!" he finally ejaculated. "Are any of those professors coming along?"

"No," said Captain Carroll dryly. "It's up to the patrol, as usual. The professors know what the chances are of getting mixed up with the explosion and they are not taking any of it. Didn't you wonder a bit at the explicit statement that we 'would be held strictly accountable for the valuable equipment'?"

Stoney's pipe went back into his mouth. "Well," he growled through the corner of his lips, "it's nice to know that we're on the expendable list. Looks like one swell way to decrease the size of the patrol, just like the Senate has been demanding ever since the end of the Uranus War."

"Perhaps we'll surprise 'em," Carroll answered. "This is a handy ship, if she is a bit old; and the lifeboats are the newest and best made—all but that old

repair boat, and her hull is sound enough. Anyhow, we have orders to get pictures and report what happens. So we do our damndest."

Private Kelton's tenor again rang out:

*"Oh, the Goat's got loose in the Pleiades,  
Cassiopeia sits on Cephus' knees,  
Berenice's Hair blows out on the breeze,  
So burn, rocket, burn!"*

"Pity that man's so scatterbrained. He's a born leader. I think if he behaved himself for as much as six months at a stretch I'd make a petty officer out of him. He knows enough," Captain Carroll said. "Well, good night, Stoney. Early start tomorrow."

AS THE two officers went below, Private Snell, his eyes large and round, came out of the charthouse. "Whe-ew!" he said under his breath. "So *that's* the idea of this phony cruise, huh?" He sat down in the shadow of the charthouse, his chin in his hands. He felt a bit queer. Flying straight toward a sun collision, huh? Snell had been working hard to learn sky navigation for the past two years, and he already knew enough to realize what the ship's orders meant. "Just about one chance in a million we don't get pulled in or burned in the crash. No wonder they detached all the married men! No wonder they haven't told us where we're bound! Well, it'll be something to watch!" He gulped a little as he rolled a cigarette.

"Shucks!" he finally said under his breath. "You've been sore because you didn't get into the war. You've grouched because cruising was just one damn planet after another. So why worry? Just as soon get hit by a rogue star as a Morrell ray! Can't croak but once!" He squared his shoulders and got up. Clambering through the catwalk rail he slid down the shining slope of the nose, landing on the fin gently.

Kelton at once began to improvise:

*"Old Private Snell sits up all night,  
He works in the dark and not in the light.  
He's learned to take a three-way sight,  
Good old Navigator Snell!"*

"How's the space navigation coming, young un?" asked Sergeant McClure.

"Pretty tough, but I'm getting on, I think," Snell answered.

"Too bad you and Kelton went on the Ophidia party," the sergeant grunted. "Might get a rating if you hadn't. But not with that spot on your record. They don't make corporals out of ship jumpers!"

Kelton snapped an angry chord on his banjo. "Lay off Snell, can't you? That Ophidia party was my foolishness. He was the rawest boot in the fleet then, and didn't know what he was doing. He'd have had a stripe before this if you'd quit riding him!"

McClure grunted. "I don't ride anybody with a clean record," he said tersely. "Fine notion it'd be for me to recommend somebody for a step and when the captain looks at his record there it is—nice red ink. 'Absent without official leave. Missing emergency all-hands work.' Yah!"

Snell crossed his hands behind his head and stared at the North Star. "Well," he said, "maybe you know a lot about the captain, sergeant, and maybe you're just a sour-pussed old-timer. Anyhow, I heard the captain say tonight that if Kelton here kept his nose clean for six months he'd make a corporal of him. Said he knew enough and was a born leader. Chew on that, sergeant!"

McClure turned, resentful surprise in his eyes. "Kelton?" he said incredulously. "If he rates Kelton, remember Mr. Stoney and I'll be on the examining board!"

Kelton grinned sweetly. "Better study up a bit on your fuel equations

then, sarge. The examiner's supposed to know at least as much as the candidate."

"Bah!" snorted the sergeant, and stalked away.

SNELL'S eyes followed the sergeant's indignant back, then turned to Kelton. "You oughtn't to get him so mad, Kel," he said.

Kelton grinned. "I know it—but I just can't help cracking when he leads with his chin that way. Besides, he's right. He's a tough old crab, but he's got the right idea. This patrol has got to be in charge of responsible guys, even small working parties. And it'd take a brighter man than old McClure to call me one after a gander at my record!"

"Yeah, I reckon so. But they might give a guy a chance to make good even if he was a fool now and then."

"Sure, that's why I climbed him about ridin' you. You ain't the floater I was at your age. I just had to raise hell when I was a kid; and during the war you could get away with plenty if you knew your stuff. After the war I was tagged: 'Ship-jumper'; 'Leaving clothing in unauthorized places'; 'Late for quarters'; 'Frivolous and abusive language to his superior in the execution of his office'—all the jolly bunk that brash kids think is funny. Yeah, they'd hung the name on this dog and there wasn't a prayer of getting it rubbed off. But I like the patrol, and I'm kind of privileged in a way. I'll always be just Private Kelton, who'd have been a technical sergeant by now if he'd had any sense. But I have a good time."

Snell inhaled deeply on his cigarette and let the snot trickle from his nostrils. "I wasn't kidding about what I told McClure," he said. "The skipper did say that."

Kelton laid down his banjo and stared. "No foolin'?" he asked.

"No foolin'." "Six months," he said. Kel, he said a lot more I can't spill; but

I can tell you this: it's going to be more than six months before there'll be any chance of liberty or jumping ship. A lot more, or I miss my guess. If you just don't just sass McClure too much and don't be late relieving the watch, I bet Captain Carroll would give you a chance. Hell's bells, Kel, he's got to have some excuse to give people for rating you. Why not give him one?"

"Hin-m-m!" Kelton answered slowly, his eyes half shut. "The skipper must have said a mouthful! Did he mention Lyra 2488?"

Snell stared. "Who told you? I didn't!"

"Infant!" Kelton chuckled. "Don't you read the papers? Isn't the way they've stripped the ship of everybody with dependents and stocked her up with enough junk to cruise all around the Galaxy without stopping enough? Especially all those nifty Mark XIX lifeboats all shiny new? Lookit, kid, I know my patrol and the lousy jobs it gets. Don't you know I've been back ahead of time every liberty this whole overhaul period? I could have been ashore tonight, but I was afraid I might get a hooter too many and miss the ship. Sure, I know where we're going without being told, and I wouldn't miss it for plenty. It's things like this that make the patrol worth livin' in! Excitement! That's old Private Kelton's middle name! If there isn't any, I gotta stir some up!"

CHIN IN HAND, Snell gazed at the older man. He drew a long breath. "You think it's going to be tough going? Will we get close enough to get some real excitement?"

Kelton nodded. "You ought to know the skipper by now. He's got orders to observe that star crash. He's going to observe it—and he's not going to be far enough away to have to say 'apparently,' or 'maybe' in his report. Tell Arthur T. Carroll, Captain, S. P., to go measure



a nova, and he'll get close enough to use a tapeline and a dippy lead. No, kid, this is a real party. Those of us that get back will be splitting crackers in a lifeboat, I bet you!"

"Snell's shoulders squared. "Then," he said grimly, "here's our chance, Kel! I'm as good a navigator as there is aboard, barring the officers, and you know more about a ship's machinery and communications than any petty officer in the whole giddy ship. We'll do our stuff as usual as long as the ship holds together—but if we have to abandon her, the boat officer's going to find out what we're worth. What do you say?"

Kelton's voice was amused and lazy. "Swell, kid. I'll play ball. But have you noticed the new watch, quarter, and station bill?"

"No. Why?"

"Because, good old Navigator Snell, you and I are the crew of the little old repair boat at 'abandon ship,' and our boat officer is no other than old Sergeantn Cyrus Jonas McClure."

Snell whistled softly. "Oh, well," he said at last. "You can't ever tell. We can give him a try, anyhow."

"Sure," Kelton assented. "We'll give him a run for his money. Maybe can get you out of hock, at least."

Just before daylight, before even a reporter had found his way to the space port, the *Beagle* slid hissing up the ramp and leaped from her carrier into the sky. For three days the routine was normal as the crew polished and removed the last traces of overhaul dust and grease. When she was clean to such a point that not even Commander Stoney could find anything about which to grumble, the crew discovered that this was going to be a somewhat different cruise.

True, the alarm gongs whirled noisily at the same eight forty-five each morning, but instead of gun drills, every day saw some variation of boat drill. Division officers and squad leaders, in

reporting at muster, checked the contents of the boat lockers and the equipment as well as the presence of the men. Space suits were overhauled and air tanks tested as frequently and thoroughly as firing locks and ammunition hoists. At irregular intervals the boats were actually launched, maneuvering like flashing minnows around the speeding ship. Careful time checks were kept, and the men soon learned that any boat slow in getting over the side at these drills had to do it over and over until the time was satisfactory, even if a meal was delayed in the process. Even the petty officers became frankly puzzled as the days went by.

"THE PATROL'S getting soft!" grumbled Sergeant McClure one day as the repair boat hung aloft, waiting her turn at the landing cradles. "Instead of training to fight, the new regulations seem to be training us to run!" He cocked an eye at Kelton as if expecting some sarcastic reply.

Kelton's face remained expressionless. "Maybe," he said, "they're planning a landing force somewhere that taking the ship too close to isn't good medicine."

The sergeant snorted. "Landing force! A sweet job I'd have landing with just you two birds to back me up."

Kelton smiled. "Sarge, you couldn't do better. Just think, you'd have the best intelligence of any boat there is. I know every planet between here and the Orion Nebula. This boat's crew will never get lost."

McClure bent a baleful glare on Kelton. "You tryin' to get funny?"

"Me?" was the bland reply. "No indeedy. It's just one result of collecting a bum record like mine. Name your planet, and after Snell navigates you there I'll show you the way to the post office."

"To Kitty Korfdop's barroom, you mean," growled McClure.

"Sure, if that's where you want to

go," Kelton said. "But, sarge, joking aside, I didn't like the hum in the boat's starboard engine today. Did you hear it?"

"No. What about it?"

"Sounds to me like a gland's about to carry away. Don't you think I better overhaul it?"

The sergeant's lean jaw thrust forward. "Tryin' to lay the boat up and get out of drills, huh?"

"Nix, sarge, I mean it. Get Mr. Parks to listen if you don't believe me. If you'll let me take it down right after drill I'll have it together again tomorrow—if we can work through the night on it, Snell and me."

McClure scratched his chin in bewilderment. "You, askin' for night work? Say, what's the idea?"

"Idea is I don't like the notion of havin' the slowest boat in the ship bust her gear while I'm fiddling around space inside. The skipper's getting us ready for some fancy boat maneuvering—and you know the skipper. It won't be any parade for the mayor. It'll be speed or else, no matter what his game is."

"Hm-m-m!" said the puzzled sergeant. "All right, go see Mr. Parks. If you're tryin' to kid me, watch your step."

THE ENGINEER officer proved very willing to inspect the repair boat's motor, and not a little anxious when he heard the sound. "Intermittent hum in the accumulator? Let's take a look!"

Sergeant McClure grew more and more puzzled as he watched Kelton, before Lieutenant Parks' approving professional eyes, strip the accumulator and lift out the offending gland. "See, sir," he said, pointing. "There's some pitting inside and a hair crack in the flange. Geeze! Let her all out and she'd have blown like a toy balloon!"

The engineer officer was peering through the entire engine with a troubled face. "The whole damned setup

looks none too good to me, and I'm afraid of the spares for this old Mark XIII design. They're at least ten years in store—old war stock, at the best. 'Fraid we'll have to build a whole new outfit in the shop, and that means the boat will be out of commission for plenty long time."

"I think we needn't build a Mark XIII, sir," Kelton said abruptly. The engineer officer looked up with a frown and McClure made a growling noise in his throat. "Shootin' off your face again?" the sergeant was beginning; but Kelton pulled a scrawled sheet of paper from his pocket and talked only to the engineer.

"Look, sir, the fault in this old Mark XIII was the twist in the gas line. It put too much strain on the joints and wasted a lot of thrust in getting around corners. That's why XIV and all the later models changed the whole plan. But the Mark XIII idea was good—if it could get a straight outlet it really gets more power than even the XIX, with about three fourths the fuel. Couldn't we try it this way? We could use the new vanadium-dural tubing, and by moving the combustion pot about six inches aft there'd be room for a Curzon gland that you can clean without breaking everything down. Wouldn't that work, sir?"

Lieutenant Parks studied the diagram eagerly. "By golly, Kelton, I think you've got something! Let's take this to the skipper. Come on, McClure."

Captain Carroll's face hardened when Mr. Parks, accompanied by the flushed Kelton and the glowering sergeant entered the cabin. "Trouble again?" he asked with a side glance at Kelton.

The lieutenant laughed. "Not that kind, captain. It's engine trouble in the repair boat. Kelton has got what looks like a pretty good plan for quick and solid repairs, but it means changing the general design. We want your permission to try out."

"The engine can't run as is?" asked Captain Carroll.

"No, sir. She'd pop at anything over two thirds power. But look at the sketch, sir. It looks good to me."

The captain studied the scrawled sketch, tracing the fuel flow with his forefinger. "You plan this, Kelton?" he asked, looking up.

"Yes, sir," was the embarrassed reply.

Carroll scribbled. "O. K., A. T. C.," on the corner of the sketch and held it out to Lieutenant Parks. "Make it an urgent job," he said. "Glad to see you in my cabin on this kind of an errand for once, Kelton. Get a clean drawing of that made and I'll submit it to the bureau of engineering when we get back. You might get a royalty on it."

AGAIN OUTSIDE the cabin, Sergeant McClure informed the world under his breath that he would be durned if he knew what to make of it. His puzzlement increased as he saw Kelton, barely stopping for an occasional cup of coffee, work steadily far into the night. At breakfast next day Kelton's face was haggard but peaceful.

"How long your repairs going to lay the boat up?" McClure asked.

Kelton let out a long sigh. "She ain't going to be laid up. We got her together just before all hands this morning. I just had time to get clean before pipe down."

"So I suppose you'll be askin' for a late hammock so you can sleep?" The sergeant's voice was contemptuous.

Kelton's old lazy grin slowly spread over his face. "Believe it or not, sarge—and you have my permission to put it in the log if you want to—this is one time that old Private Kelton is fidgeting till drill call blows. I want to show you just how high, wide and handsome the old boat can zoom with her new innards. Yes, sir! Drill can't come too soon for me—that is, after I get through with

breakfast. I'm not used to working all night, and I could eat the ammunition hoist. Pass the beans."

"Well, since you're feelin' so energetic all of a sudden, how are you on photography?"

"I'm a swell shutter pusher, but not so hot on developing. Why?"

"Orders. Each boat is issued a micro-film camera and an outfit. I gotta designate one of you birds boat photographer."

"That's me," Snell interrupted. "Right down my alley. I've been doing Mr. Smallgrove's star photography for the past six months."

Sergeant McClure stared from one to the other. "I give up," he said. "The captain hands me the two worst bums in the whole ship's complement, and here they go professional on me. What happened to you two?"

"Us? Oh, we just thought you'd be overworked having to do everything in the boat and didn't want you to break down. You don't know how much we admire you, sarge. You've got such a pretty smile," Kelton said.

McClure crimsoned with wrath. "Shut your trap!" he snapped. "I don't know what your game is, but don't try any monkey business with me! Grease will get you nowhere in my boat."

LYRA 2488 soon came into plain view, its double suns sharply visible in the screens. "We have plenty of time," Captain Carroll told his officers. "I propose to get behind the wanderer and follow it in at an angle, so we'll be behind the collision and avoid the big fragments—if there are any. Have you got it charted, Smallgrove?"

The navigator spread a chart on the desk and pointed. "Ought to sight it about here by tomorrow," he said.

"Good. Call me if there's any change in indications."

In three more days the *Beagle* had made her way across space to a position

where the three doomed stars were plainly visible without instruments, rushing toward a right-angled meeting point, with the ship keeping station in the interior of the angle. "We'd get better pictures of the fragments if we were outside the apex," Captain Carroll said regretfully. "But we'd not have much chance of getting the films back home. We can get in closer on this side."

Lieutenant Smallgrove looked worried. "Better not get too close, sir. I don't believe the dope on the rogue's mass is any too accurate, and in a day or so they may be pulling each other off the course."

"Or the other way round," Carroll nodded. "That's the chance we'll have to take. I don't want any blurred pin points on this film, and that means close range."

The cameras were going almost incessantly now, as the fateful moment of impact came closer and closer. Finally the announcers gave tongue in each compartment. "Until further orders, all hands will wear space suits and helmets, and will remain in the vicinity of their 'abandon ship' stations when not on watch." It worried Sergeant McClure. He was puzzled by this whole crazy voyage; his gunner's notions had been sadly outraged by the total lack of battle drills for the past months. Now, with a helmet on, he couldn't even ease the tension by scratching his head. "The patrol's gone to hell," he mumbled testily. "Lots of newfangled hooley!"

The ship's officers seldom left the observation ports now. At last Captain Carroll's face grew grim as he scanned his instruments, and his pencil flew in calculations. "You were right, Smallgrove," he said crisply. "They're veering toward each other rapidly, cutting the apex into an arc. Engine room! Below there!"

"Engine room!" Parks' reply sounded through the tube.

"Full power in two minutes! We've got to get out of here."

"Aye, aye, sir!" The steady drone of the generators rose to a shrill howl and the ship groaned as the helm whirled her around in a dizzily short turning circle.

"Give her all you've got!" Carroll ordered as she straightened out on a fleeing course.

Their velocity nearly doubled by mutual attraction, Lyra 2488 and the rogue star hurtled toward a head-on collision, nearer, nearer—

"Helmets closed! Ray-filter visors down!" bawled the announcers.

JUST in time. For instead of a glancing blow on one of the two suns, the wanderer's pull had jostled them almost into each other's very arms, and as the intruder crashed squarely into the first of them, both reeled against the other. Crippling flares of light enveloped the ship, then a wave of intolerable heat and finally a blast of force that drove her like a leaf in the wind. "Making planets, my eye!" gasped Commander Stoney. "That's a nova or I'm a Dutchman!"

Captain Carroll himself had thrust the helmsman aside and taken the controls, wrestling to keep the *Beagle's* head away from the flaming horror of the crash. "Engine room!" he barked. "That all the power you have?"

"Rocket vents fused, sir!" came the anxious reply. "Any more will blow the stern out of the ship!"

The captain's jaw set nervously as he watched his instruments. "Not enough!" he groaned. "The gravity is pulling us back. It's up to the boats now." He turned the wheel back to the white-faced helmsman and stepped to the alarm speaker. Even in this crisis, however, his orders remained paramount in his mind. "Cameramen!" he boomed. "Secure your cameras to your person and do not let them out of your possession

until the emergency is over! *'All hands abandon ship!'*"

The men, some still moaning from the searing effect of the light and many with scorched hands, scampered to their boat stations. The long weeks of drill justified themselves now, for boat after boat roared out of its cradle and sped ahead of the lagging ship. In the last boat the captain looked sorrowfully back at the *Beagle*, now rapidly tumbling backward toward the blazing inferno of the three fused stars. "No break-up yard for you, old girl!" he said under his breath. "You're going out like a good patrol ship should. You've done your job!"

Communication was, for a time, almost impossible as the chaotic conditions of surrounding space roared and crackled in the receivers; but finally the captain managed to get through a call to the other boats. "Set a course on Alpha Draconis," he commanded. "Use all the speed you have till your micro-repellers show no undue strain. Then communicate for orders regarding rendezvous."

Crisply the replies snapped back to him: "Barge One, Alpha Draconis!" "Cutter Five, Alpha Draconis!" In the repair boat, when Kelton succeeded in clearing the squalling microphones, McClure replied, "Repair Boat, Alpha Draconis!" then turned to Snell. "Sure you know your stuff, Snell? I've never navigated this part of the heavens myself."

Snell nodded. "If the charts are all right, so are we," he said. "How come you haven't worked this run? Never been here?"

"I'm a gunner," McClure said stiffly. "Haven't navigated since I was a corporal."

"Snell's a good navigator; the officers says so. Why couldn't he be a corporal?" Kelton asked innocently.

McClure glowered. "He hasn't navigated us anywhere yet," he growled. "Even if he does, I don't recommend

ship-jumpers. If the skipper wants to rate him, that's his business!"

"O. K., sarge. Just thought I'd mention it. Didn't you ever raise the dickens when you were a kid? Or were you ever a kid?"

"I did not!" McClure snapped. "Sky-faring is serious business. No place for foolishness like that!"

"So that's how you got so sweet-tempered, huh? Oh, sorry. Didn't mean to rile you. But didn't the skipper order all the speed you have?"

"Yes. Why?"

"Well, why not use it? You haven't let this boat out more than half power since we overhauled her. Rip her open, why don't you?"

McClure stared. "She's doin' better than she ever did, right now."

"Sure she is, but she can do plenty better than that. Ease her out, sarge. Let's see what the new engine can do."

McClure's sour face twisted into a sarcastic grin. "Private Kelton is going to show the bureau of engineering how to build rocket motors, eh? All right, here goes."

HE PUSHED the controller wide open. At once Snell seized a stanchion to keep from falling, while the sergeant sat flat on the deck as the little craft leaped ahead. Kelton, well braced on the settee, blinked a bit, but his eyes shone with satisfaction.

"Sufferin' old dyin' cries of Gemini!" gasped McClure. "She's goin' at a rate the dial won't register!" He stared round-eyed at Kelton.

"It's the same old Mark XIII principle," Kelton said quietly. "I didn't invent anything new. I just took the kinks out of the line so Mr. Parks could use the new rigid tubing. Never was anything wrong with the principle—just the design."

Snell was looking idly at the ceiling. "Seems to me," he commented to nobody in particular, "that any guy who



can figure that out ought to be a corporal."

Back at the controls, still panting a little from the terrific acceleration, McClure turned a wrathful face. "I don't want any more of this corporal talk! Once a bum, always a bum. And you bums are not going to bulldoze me. Any more of that and I'll turn you both in for willful disobedience! I'm in command here!"

The little boat was humming like a giant top. Suddenly from the nose of the ship came a sharp crack and a flash of brilliant light, followed by a short

tearing noise as a swift white cloud enveloped the boat and fled behind her. Appalled, McClure decelerated as rapidly as he dared, for as the cloud disappeared, two jagged rents in the forward plating became visible.

"A meteor pebble!" Snell cried. "It plunked right through the trimming tank. Got white-hot as it went through and blew all the water out!"

"How could a meteor—" Kelton began incredulously, then stopped as he



looked at the instrument board. McClure, with stricken face, was also staring at the panel. His eyes were tragic, and his hands trembled a little as he turned to the two privates, standing with studiously solemn faces.

"I guess this whole boat's crew is due for trouble when we get home," he said miserably. "Me, a gunner with twenty-eight years in, flying full power with no screen out. I ain't fit to be a sergeant any more than you two are fit to be corporals." He beckoned Kelton to take the controls and sat down heavily on the settee. His face dropped between his clenched fists. "'Suffering a ship under his control to be improperly hazarded,'" he quoted in a low drone. "One thing—I'll not wait for anybody else to prefer charges. I'll report myself. But—a gunner to pull a trick like that!"

Kelton and Snell looked at each other. This was a Sergeant McClure they had never seen, a humiliated, almost heart-broken McClure. Snell broke the silence. "Shucks, sarge," he said diffidently, "don't take it so hard. Anybody might have left the screen off way out here in the middle of nothing. Matter of fact, during the maneuvers last fall Commander Stoney had the screen pulled in for nearly an hour. Swore like a long-shoreman when he noticed it—but I didn't hear that he ever recommended himself for a court."

McClure looked up, unbelieving. "Commander Stoney?" he repeated wonderingly.

Snell nodded. "And you can't say Commander Stoney isn't a mighty efficient ordnance man, either."

"Well, Kelton interposed, "from all I can see, there's no great damage done if we can get some place with air and water reasonably quick. This boat's crew has patched a lot of plates in its time, and there's plenty of spares in the tail alley. We've got ten gallons of water in the gravity tank. That will keep

us from getting too thirsty till we find a place to light."

McClure, again his rigid self, rose. "Right!" he said. "Let's have a look at the chart and see what's near enough."

"And, with your permission, sarge, I'll crawl into that tank and see if I can't brace the torn plating temporarily," Kelton said, reaching for his helmet.

He crawled through the tiny air lock into the nose and began hammering and drilling. In a few minutes he returned. "Not so bad," he reported. "No frames hurt. I smoothed down the two holes and put a couple of Morgan leak stoppers in. They'll hold if we don't speed up too much."

"Good!" McClure grunted. "Got your course set, Snell?"

"Yeah. Take about eight hours, half speed. Rhumbo on Alpha Draconis XV-44, at 108 on the vertical arc. That'll bring Euclidia in sight pretty quick."

"Euclidia?" and Kelton smiled reminiscently.

"You know it?" McClure asked sharply.

"Like a book. Friendly people, good water," Kelton said. "Good beer, too. But don't eat anything you don't know about."

"Lay off the beer!" McClure commanded. "No skylarking on this cruise, Kelton!"

SOME HOURS later McClure eased the boat to the top of a grass-covered cliff. "This is a bit of luck," he said, almost smiling. "Natural, smooth ramp to nose up on, and a granite wall astern for a baffle. We can take off from here as easy as from the cradles."

The three men opened the boat wide, letting the crisp air sweep through her and dry out the air-purifying batteries. With the speed born of long experience, the torn plates were removed and carefully slagged to save the vanadium and beryllium content, new plates welded on

and a coat of enamel baked on with torches. "Now we got to find water," McClure directed.

"Hope it isn't far," Snell said. "Have to be a bucket job over this rough ground."

Kelton wiped the last of the grease from his hands and set his torch down to cool before stowing it. "Down this cliff there's a good spring. I'll bet there's a lot of people from the town up the valley watching us now. If we don't scare 'em, they'll help us with the buckets."

The three scrambled down the cliff. A busy little stream rushed chuckling under the thick foliage of the valley. McClure tasted it gingerly. "All right," he said. "Let's go."

McClure and Snell stooped to dip their buckets in the clear water. Kelton remained standing. "Polly-ocky!" he called. "Polly-ocky ron do!"

"Cut the clowning!" growled McClure over his shoulder.

Kelton filled his buckets. "I'm not clowning," he said. "Just telling the people we're friends and to come and say hello." He started to trudge up the hillside, a brimming bucket in each hand. He grinned at the apparently deserted underbrush. "Polly-ocky ron do!" he called again.

The six buckets were emptied into the tank and the men were going down for the second load. "For gosh sake!" cried the startled sergeant. Around the spring were a score of little creatures not quite three feet in height. Their erect, manlike figures were covered with soft gray fur like moleskin. Round, amber eyes shone, and broad mouths grinned to show even rows of white, horselike teeth. From each forehead sprang a pair of long, sensitive, whiplike antennae. Chattering hospitably, they trooped around the three men, peering into their faces, the long antennae gently caressing the men's cheeks and hands. "Hey, stop tickling!" shouted the sergeant.

Each man, as he carried his second load of water up the hill, was escorted by a knot of Euclidians who watched them pour the water into the tank. One little gray man scrambled over the hull and peered into the tank, then shouted to his companions. At his word the buckets were snatched from the Earthmen's hands and the Euclidians formed a line down the hill. Like an old-time fire brigade, the buckets flew from hand to hand and the water level in the tank began to rise rapidly.

Kelton sat down and lighted a cigarette. "I thought they'd help when they caught on," he said. "They're friendly little cusses."

McCLURE, hands on hips, pursed his mouth and shook his head. "Amazing," he said. "Get your camera, Snell. Intelligence might like some pictures of these fellows." He wandered down the hill, an eager band of Euclidians gabbling cheerfully around him. One held out a large bunch of purple, grapelike fruit.

"Hey!" called Kelton in alarm. "Don't eat that, sarge!" But McClure, with as near a smile as they had ever seen on his grim face, had already nodded his thanks and put a grape into his mouth. "What did you say?" he called.

"I said better not eat those," Kelton replied.

"They're all right. They're good," grunted the sergeant. "Come get the pictures, Snell."

Kelton shrugged. "He can't say I didn't warn him," he said. "Snell, don't eat any fruit they give you. It'll make you drunk as a coot!"

It was already having its effect on the stiff old sergeant. A smile of oily imbecility was spreading across his face. "Come get pitcher, Snell! Tol' you I wan' pitcher," he half giggled. The little gray Euclidians began to laugh. A few started to whistle and sing, patting

their tiny hands and stamping their feet. A ring formed around McClure, and two of them began a leaping, faunlike dance.

The sergeant was swaying from side to side. "Thash shtuff!" he coughed. "Dance, doggone you! Lesh have a singsong." Babbling unsteadily, he danced himself.

"Well, what do you know about that!" Snell grunted.

"It sure got to him quick," Kelton as-sented. "They kick like a mule, those grapes. He'll pass out in a minute and'll be out a long time. I was ten hours overtime here once."

The little valley was now a shifting, swaying mass of dancers. They jumped around the awkwardly capering sergeant. He swung two of them to his shoulders as he hopped about like a dancing bear. "Whoopee!" shouted the dignified Sergeant McClure. Then suddenly he swayed, stumbled and sprawled headlong. By the time Kelton and Snell reached him he was snoring heavily.

"Out like a light," commented Kelton. "Poor old gink, what a head he's going to have when he wakes up. Let's get him to the boat."

SERGEANT MCCLURE stirred uneasily and opened his eyes. A low groan came from his throat. Snell was at his side with a cup of steaming coffee. "Drink this, sarge. It'll make you feel better." Unsteadily McClure rose on one elbow and reached a shaking hand for the cup. "What's the matter?" he said thickly. "What hit me?"

"That fruit you ate. It's . . . it's kind of poison, I guess. Kel's been kicking himself he didn't tell you in time."

McClure gulped the scalding coffee, gasping after each mouthful. "Come to think of it, he did tell me not to eat 'em," he said. "I been sick long?"

"About twelve hours."

McClure sat up suddenly, his face startled. "Hey! We're under way!"

"Yeah," Snell answered. "We thought you'd want to get back on the course and report in to the skipper, so we buzzed along. We got into communication about an hour ago."

"You did? What did you tell 'em?" was the anxious query.

"I'll bring you the log so you can see," Snell replied. "We wrote it up as we went along, but left it for you to sign. Kelton said he got a dose of those bum grapes once and that you'd be all right when you woke up, so there was no use putting anything in the log about you being sick."

McClure was scanning the pages through uncertain eyes. "Rendezvous for fuel and provisions on Rigel VI," he read. "Hm-m-m—were we the last boat to report?"

"No, we heard three of 'em check in after we did. The extra speed in the new engine made up the lost time."

When McClure looked up, much of the anxiety was gone from his face.

"You two seem to have done pretty well," he admitted. "Did you get those pictures of Euclidia?"

Snell looked uncomfortable. "I got some pictures," he said. "But they're terrible. There's a shot of the landing place that's good; but Intelligence won't want the rest of the film. I was going to destroy it."

Disciplinarian McClure reasserted himself. "You'll destroy nothing without permission! I'm in command, so don't get fresh. Bring that reel here and let me see it."

Snell shrugged. "You won't like it, sarge." He brought the tiny spool and fed it into a little projector. The small motor began to hum and the pictures unfolded before the startled sergeant's eyes, flickering across the bulkhead of the tiny cabin.

He saw himself descending the Euclidian hill surrounded by laughing, furry little men. He saw himself eating plump, purple grapes. Then the

pictured events followed swiftly; and audible gasps tore from his throat as his image whirled like a dervish, a shouting gray dwarf on each shoulder, and his drunken voice howled down the sound track, "Lesh have singsong! Whoopee!"

His face dropped into his hands and he groaned. "Drunk and disorderly!" he moaned. "Me, drunk and disorderly!"

Snell's hand dropped on the sergeant's shoulder. "Aw, sarge, buck up! You weren't drunk; you were poisoned. You didn't drink a thing—neither did we. Sure, that film looks like a gosh-awful binge, but it was just those damn grapes. Kel told me I better destroy this film, and I agree with him. Don't feel so bad. Heck, anybody can get poisoned. But I got to go relieve Kelton at the controls. You want him to bring you some more coffee?"

McCLURE nodded weakly. His hands hung limp over his knees, and his eyes stared dumbly into space. Sergeant Cyrus Jonas McClure with twenty-eight years of impeccable service! Sergeant McClure, the disciplinarian, "Regulation Cyrus!" Guilty in one short twenty-four hours, first of willful negligence imperiling his ship, then scandalous conduct to the prejudice of good order and discipline. Careless about the screen, then making a holy show of himself in a strange planet! A whole lifetime's reputation shot in an hour. But Snell's voice still rang in his ears. "Commander Stoney had the screen pulled in. . . . Heck, anybody can get poisoned—" Why, doggone it, he's right! Anybody can get into trouble. Those two have been trying to play on the team—they've taken care of me while I was being dumb like I was a rookie. They've done the real work in command of this boat, not me. I'm getting old, I guess. And I thought they were just a pair of bums riding me—"

He rose shakily from his bunk and

sat down at the miniature desk alongside. Slowly at first, then with increasing rapidity, he began to write the voyage report which would be due upon arrival at the Rigellian base. As he signed his name he straightened his back. There was a flush on his tanned face, and his jaw was stern; but in his eyes was a light that would have startled many of his shipmates.

Kelton came in with another cup of coffee. "Feeling better, sarge? Those grapes are bad business. I tried to warn you, but I was too slow about it."

"I heard you. I thought you were kidding. Thanks, Kelton. Want to see the voyage report?"

With growing amazement, Private Kelton scanned the sheets of paper. His startled eyes read an accurate, complete and laudatory account of the behavior of Kelton's engine, of Snell's navigation. McClure had made mention of Private Kelton's "valuable knowledge of the planet Euclidia and his diplomacy in enlisting the aid of the inhabitants." He gave due credit for the efficient and rapid repairs, the take-off, calculation of course, and correct reporting of the boat's position "during temporary illness of the sergeant in command due to injudicious eating of toxic fruits." Finally, as his jaw sagged in astonishment, he read that "Sergeant C. J. McClure, while recognizing that the past records of Privates Kelton and Snell have not been flawless, nevertheless believes that they have shown knowledge and qualities of mind in emergency which amply justify their promotion. It is, therefore, recommended—"

Kelton looked at McClure and drew a long breath. "Sarge," he said, stammering a little, "you're a swell guy! Thanks. After that recommendation, you bet I won't let you down, and neither will Snell. Thanks a lot."

Sergeant McClure achieved a real grin. His lean hand shot out. "Shake, shipmate!" he said gruffly.

# CHILDREN OF THE "BETSY B."



BY MALCOLM JAMESON

## CHILDREN OF THE "BETSY B."

*Malcolm Jameson tells of a little steam launch—that grew up and ran away to sea!*

I MIGHT never have heard of Sol Abernathy, if it hadn't been that my cousin, George, summered in Dockport year before last. The moment George told me about him and his trick launch, I had the feeling that it all had something to do with the "Wild Ships" or "B-Boats," as some called them. Like everyone else, I had been speculating over the origin of the mysterious, unmanned vessels that had played such havoc with the Gulf Stream traffic. The suggestion that Abernathy's queer boat might shed some light on their baffling behavior prodded my curiosity to the highest pitch.

We all know, of course, of the thoroughgoing manner in which Commodore Elkins and his cruiser division recently rid the seas of that strange menace. Yet I cannot but feel regret, that he could not have captured at least one of the Wild Ships, if only a little boat, rather than sink them all ruthlessly, as he did. Who knows? Perhaps an examination of one of them might have revealed that Dr. Horatio Dilbiss had wrought a greater miracle than he ever dreamed of.

At any rate, I lost no time in getting up to the Maine coast. At Dockport, finding Sol Abernathy was simplicity itself. The first person asked pointed him out to me. He was sitting carelessly on a bollard near the end of the pier, basking in the sunshine, doing nothing in particular. It was clear at first glance that he was one of the type generally referred to as "local character." He must have been well past sixty, a lean, weathered little man, with a quizzical eye and a droll manner of speech that, under any other circumstances,

might have led me to suspect he was spoofing—yet remembering the strange sequel to the Dockport happenings, the elements of his yarn have a tremendous significance. I could not judge from his language where he came from originally, but he was clearly not a Down Easter. The villagers could not remember the time, though, when he had *not* been in Dockport. To them he was no enigma, but simply a local fisherman, boatman, and general utility man about the harbor there.

I introduced myself—told him about my cousin, and my interest in his boat, the *Betsy B.* He was tight-mouthed at first, said he was sick and tired of being kidded about the boat. But my twenty-dollar bill must have convinced him I was no idle joshier.

"We-e-ell," he drawled, squinting at me appraisingly through a myriad of fine wrinkles, "it's about time that somebody that really wants to know got around to astin' me about the *Betsy B.* She was a darlin' little craft, before she growed up and ran away to sea. I ain't sure, myself, whether I ought to be thankful or sore at that perfesser feller over on Quiquimoc. Anyhow, it was a great experience, even if it did cost a heap. Like Kiplin' says, I learned about shippin' from her."

"Do I understand you to say," I asked, "that you no longer have the launch?"

"Yep! She went—a year it'll be, next Thursday—takin' 'er Susan with 'er."

This answered my question, but shed little light. Susan? I saw I would do better if I let him ramble along in his own peculiar style.



"Well, tell me," I asked, "what was she like—at first—how big? How powered?"

"THE *Betsy B* was a forty-foot steam launch, and I got 'er secondhand. She wasn't young, by any means—condemned navy craft, she was—from off the old *Georgia*. But she was handy, and I used 'er to ferry folks from the islands hereabouts into Dockport, and for deep-sea fishin'.

"She was a dutiful craft—" he started, but broke off with a dry chuckle, darting a shrewd sideways look at me, sizing me up. I was listening intently. "Ye'll have to get used to me talkin' of 'er like a human," he explained, apparently satisfied I was not a scoffer, "'cause if ever a boat had a soul, *she* had. Well, anyhow, as I said, she was a dutiful craft—did what she was s'posed to do and never made no fuss about it. She never wanted more'n the rightful amount of oil—I changed 'er from a coal-burner to an oil-burner, soon as I got 'er—and she'd obey 'er helm just like you'd expect a boat to.

"Then I got a call one day over to Quiquimoc. That perfesser feller, Doc Dilbiss, they call him, wanted to have his mail brought, and when I got there, he ast me to take some things ashore for 'im, to the express office. The widder Simpkins boy was over there helpin' him, and they don't come any more wuthless. The Doc has some kind of labortory over there—crazy place. One time he mixed up a settin' of eggs, and hatched 'em! Made 'em himself, think of that! If you want to see a funny-lookin' lot of chickens, go over there some day—"

"I shall," I said. I wanted him to stay with the *Betsy B* account, not digress. His Doc Dilbiss is no other than Dr. Horatio Dilbiss, the great pioneer in vitalizing synthetic organisms. I understand a heated controversy is still raging in the scientific world over

his book, "The Secret of Life," but there is no doubt he has performed some extraordinary feats in animating his creations of the test tube. But to keep Abernathy to his theme, I asked, "What did the Simpkins boy do?"

"This here boy comes skippin' down the dock, carryin' a gallon bottle of some green-lookin' stuff, and then what does he do but trip over a cleat on the stringer and fall head over heels into the *Betsy B*. That bottle banged up against the boiler and just busted plumb to pieces. The green stuff in it was sorta oil and stunk like all forty. It spread out all over the insides before you could say Jack Robinson, and no matter how hard I scoured and mopped, I couldn't get up more'n a couple of rags full of it.

"You orter seen the Doc. He jumped up and down and pawed the air—said the work of a lifetime was all shot—I never knew a mild little feller like him could cuss so. The only thing I could see to do was to get outa there and take the Simpkins boy with me—it looked sure like the Doc was a-goin' to kill him.

"Naturally, I was pretty disgusted myself. Anybody can tell you I keep clean boats—I was a deep-sea sailor once upon a time, was brought up right—and it made me durned mad to have that green oil stickin' to everything. I took 'er over to my place, that other little island you see there—" pointing outside the harbor to a small island with a couple of houses and an oil tank on it—"and tried to clean 'er up. I didn't have much luck, so knocked off, and for two-three days I used some other boats I had, thinkin' the stink would blow away.

"When I got time to get back to the *Betsy B*, you coulda knocked me down with a feather when I saw she was full of vines—leastways, I call 'em vines. I don't mean she was full of vines, but they was all over 'er insides, clingin'

close to the hull, like ivy, and runnin' up under the thwarts, and all over the cylinders and the boiler. In the cockpit for'ard, where the wheel was, I had a boat compass in a little binnacle. Up on top of it was a lumpy thing—made me think of a gourd—all connected up with the vines.

"I grabbed that thing and tried to pull it off. I tugged and I hauled, but it wouldn't come. But what do you think happened?"

"I haven't the faintest idea," I said, seeing that he expected an answer.

"She rared up and down, like we was outside in a force-six gale, and *whistled!*" Abernathy broke off and glared at me belligerently, as if he half expected me to laugh at him. Of course, I did no such thing. It was not a laughing matter, as the world was to find out a little later.

"And that was stranger than ever," he continued, after a pause, "'cause I'd let 'er fires die out when I tied 'er up. Somehow she had steam up. I called to Joe Binks, my fireman, and bawled him out for havin' lit 'er off without me tellin' him to. But he swore up and down that he hadn't touched 'er. But to get back to the gourd thing—as soon as I let it go, she quieted down. I under-ran those vines to see where they come from. I keep callin' 'em vines, but maybe you'd call 'em wires. They were hard and shiny, like wires, and tough—only they branched every whichaway like vines, or the veins in a maple leaf. There was two sets of 'em, one set runnin' out of the gourd thing on the binnacle was all mixed up with the other set comin' out of the bottom between the boiler and the engine.

"She didn't mind my foolin' with the vines, and didn't cut up except whenever I'd touch the gourd arrangement up for'ard. The vines stuck too close to whatever they lay on to pick up, but I got a pinch-bar and pried. I got some of 'em up about a inch and slipped

a wedge under. I worked on 'em with a chisel, and then a hacksaw. I cut a couple of 'em—and by the Lord Harry—if they didn't grow back together again whilst I was cuttin' on the third one. I gave up! I just let it go, I was that dog-tired.

"Before I left, I took a look into the firebox and saw she had the burner on slow. I turned it off, and saw the water was out of the glass. I secured the boiler, thinkin' how I'd like to get my hands on whoever lit it off.

"NEXT DAY, I had a fishin' party to take out in my schooner, and altogether, what with one thing and another, it was a week before I got back to look at the *Betsy B*. Now, over at my place, I have a boathouse and a dock, and behind the boathouse is a fuel oil tank, as you can see. This day, when I went down to the dock, what should I see but a pair of those durned vines runnin' up the dock like 'lectric cables. And the smoke was pourin' out of 'er funnel like everything. I ran on down to 'er and tried to shut off the oil, 'cause I knew the water was low, but the valve was all jammed with the vine wires, and I couldn't do a thing with it.

"I found out those vines led out of 'er bunkers, and mister, believe it or not, but she was a-suckin' oil right out of my big storage tank! Those vines on the dock led straight from the *Betsy B* into the oil tank. When I found out I couldn't shut off the oil, I jumped quick to have a squint at the water gauge, and my eyes nearly run out on stems when I saw it smack at the right level. Do you know, that dog-gone steam launch had thrown a bunch of them vines around the injector and was a-feedin' herself? Fact! And sproutin' from the gun'le was another bunch of 'em, suckin' water from over-side.

"But wouldn't she salt herself?" I asked of him, knowing that salt water

is not helpful to marine boilers.

"No, sir-ree! That just goes to show you how smart she was gettin' to be. Between the tank and the injector, durned if she hadn't grown another fruity thing, kinda like a watermelon. It had a hole in one side, and there was a pile of salt by it and more spillin' out. She had rigged 'erself some sorta filter—or distiller. I drew off a little water from a gauge cock, and let it cool down and tasted it. Sweet as you'd want!

"I was kinda up against it. If she was dead set and determined to keep steam up all the time, and had dug right into the big tank, I knew it'd run into money. I might as well be usin' 'er. These vines I've been tellin' you about weren't in the way to speak of; they hung close to the planks like the veins on the back of your hand. Seein' 'er bunkers was full to the brim, I got out the hacksaw and cut the vines to the oil tank, watchin' 'er close all the time to see whether she'd buck again.

"From what I saw of 'er afterward, I think she had a hunch she was gettin' ready to get under way, and she was r'arin' to go. I heard a churnin' commotion in the water, and durned if she wasn't already kicking her screw over! Just as I got the second vine cut away, she snaps her lines, and if I hadn't made a flyin' leap, she'd a gone off without me.

"I'm tellin' you, mister, that first ride was a whole lot like gettin' aboard a unbroken colt. At first she wouldn't answer her helm. I mean, I just couldn't put the rudder over, hardly, without lyin' down and pushin' with everything I had on the wheel. And Joe Binks, my fireman, couldn't do nuthin' with 'er neither—said the throttle'd fly wide open every time he let go of it.

"Comin' outa my place takes careful doin'—there's a lot of sunken ledges and one sandbar to dodge. I says to

myself, I've been humorin' this baby too much. I remembered she was tender about that gourd thing, so the next time I puts the wheel over and she resists, I cracks down on the gourd with a big fid I'd been splicin' some five-inch line with. She blurted 'er whistle, and nearly stuck her nose under, but she let go the rudder. Seein' that I was in for something not much diffrent from bronco bustin', I cruised 'er up and down outside the island, puttin' 'er through all sorts a turns and at various speeds. I only had to hit 'er four or five times. After that, all I had to do was to raise the fid like I was a-goin' to, and she'd behave. She musta had eyes or something in that gourd contraption. I still think that's where her brains were. It had got some bigger, too.

"I didn't have much trouble after that, for awhile. I strung some live wires across the dock—I found she wouldn't cross that with 'er feelers—and managed to put 'er on some sort of rations about the oil. But I went down one night, 'round two in the mornin', and found 'er with a full head of steam. I shut everything down, leavin' just enough to keep 'er warm, and went for'ard and whacked 'er on the head, just for luck. It worked, and as soon as we had come to some sorta understanding, as you might say, I was glad she had got the way she was.

"What I mean is, after she was broke, she was a joy. She learned her way over to Dockport, and, after a coupla trips, I never had to touch wheel or throttle. She'd go back and forth, never makin' a mistake. When you think of the fogs we get around here, that's something. And, o' course, she learned the Rules of the Road in no time. She *knew* which side of a buoy to take—and when it came to passin' other boats, she had a lot better judgment than I have.

"Keepin' 'er warm all the time took some oil, but it didn't really cost me

any more, 'cause I was able to let Joe go. She didn't need a regular engineer, nohow—in fact, her and Joe fought so, I figured it'd be better without him. Then I took 'er out and taught 'er how to use charts."

ABERNATHY stopped and looked at me cautiously. I think this must be the place that some of his other auditors walked out on him, or started joshing, because he had the slightly embarrassed look of a man who feels that perhaps he had gone a little too far. Remembering the uncanny way in which the Wild Ships had stalked the world's main steamer lanes, my mood was one of intense interest.

"Yes," I said, "go on."

"I'd mark the courses in pencil on the chart, without any figures, and prop it up in front of the binnacle. Well, that's all there was to it. She'd shove off, and follow them courses, rain, fog, or shine. In a week or so, it got so I'd just stick a chart up there and go on back and loll in the stern sheets, like any payin' passenger.

"If that'd been all, I'd a felt pretty well off, havin' a trained steam launch that'd fetch and carry like a dog. I didn't trust 'er enough to send 'er off anywhere by herself, but she coulda done it. All my real troubles started when I figured I'd paint 'er. She was pretty rusty-lookin', still had the old navy-gray paint on—what was left of it.

"I dragged 'er up on the marine railway I got over there, scraped 'er down and got ready to doll 'er up. The first jolt I got was when I found she was steel, 'stead of wood. And it was brand, spankin' new plate, not a pit or a rust spot anywhere. She'd been pumpin' sea water through those vines, eatin' away the old rotten plankin' and extractin' steel from the water. Somebody—I've fergotten who 'twas—told me there's every element in sea water if you can get it out. Leastways, that's how I ac-

count for it—she was wood when I bought 'er. Later on you'll understand better why I say that—she could do some funny things.

"The next thing that made me sit up and take notice was the amount of paint it took. I've painted hundreds of boats in my time, and know to the pint what's needed. Well I had to send to town for more; I was shy about five gallons. Come to think about it, she did look big for a forty-footer, so I got out a tape and laid it on 'er. She was fifty-eight feet over all! And she'd done it so gradual I never even noticed!

"But—to get along. I painted 'er nice and white, with a red bottom and a catchy green trim, along the rail and canopy. We polished 'er bright-work and titivated 'er generally. She did look nice, and new as you please—and in a sense she was, with the bottom I was tellin' you about. You'd a died a-laughin' though, if you'd been with me the next day, when we come over here to Dockport. The weather was fine, and the pier was full of summer people. As soon as we come up close, they began cheerin' and callin' out to me how swell the *Betsy B* looked in 'er new colors. Well, there was nothin' out of the way about that. I went on uptown and 'tended to my business, came back after awhile, and we shoved off.

"But do you think that blamed boat would leave there right away? No, sir! Like I said, lately I'd taken to climbin' in the stern sheets and givin' 'er her head. But that day, we hadn't got much over a hundred yards beyond the end of the pier, when what does she do but put 'er rudder over hard and come around in an admiral's sweep with wide-open throttle, and run back the length of the pier. She traipsed up and down a coupla times before I tumbled to what was goin' on. It was them admirin' people on the dock and the

summer tourists cheerin' that went to 'er head.

"All the time, people was yellin' to me to get my wild boat outa there, and the constable threatenin' to arrest me 'cause I must be drunk to charge up and down the harbor thataway. You see, she'd gotten so big and fast she was settin' up plenty of waves with 'er gallivantin', and all the small craft in the place was tearin' at their lines, and bangin' into each other something terrible. I jumped up for'ard and thumped 'er on the skull once or twice, 'fore I could pull 'er away from there.

FROM THEN on, I kept havin' more'n more to worry about. There was two things, mainly—her growin', and the bad habits she took up. When she got to be seventy feet, I come down one mornin' and found a new bulkhead across the stern section. It was paper-thin, but it was steel, and held up by a mesh of vines on each side. In two days more it was as thick, and looked as natural, as any other part of the boat. The funniest part of that bulkhead, though, was that it put out rivet heads—for appearance, I reckon, because it was as solid as solid could be before that.

"Then, as she got to drawin' more water, she begun lengthenin' her ladders. They was a coupla little two-tread ladders—made it easier for the womenfolks gettin' in and out. I noticed the treads gettin' thicker 'n' thicker. Then, one day, they just split. Later on, she separated them, evened 'em up. Those was the kind of little tricks she was up to all the time she was growin'.

"I coulda put up with 'er growin' and all—most any feller would be tickled to death to have a launch that'd grow into a steam yacht—only she took to runnin' away. One mornin' I went down, and the lines was hangin' off the dock, parted like they'd been chafed in two. I cranked my motor dory and started out

looking for the *Betsy B.* I sighted 'er after awhile, way out to sea, almost to the horizon.

"Didja ever have to go down in the pasture and bridle a wild colt? Well, it was like that. She waited, foxylike, lyin' to, until I got almost alongside, and then, doggone if she didn't take out, hell bent for Halifax, and run until she lost 'er steam! I never woulda caught 'er if she hadn't run out of oil. At that, I had to tow 'er back, and a mean job it was, with her throwing 'er rudder first this way and that. I finally got plumb mad and went alongside and whanged the livin' daylights outa that noodle of hers.

"She was docile enough after that, but sulky, if you can imagine how a sulky steam launch does. I think she was sore over the beatin' I gave 'er. She'd pilot 'erself, all right, but she made some awful bad landin's when we'd come in here, bumpin' into the pier at full speed and throwin' me off my feet when I wasn't lookin' for it. It surprised me a lot, 'cause I knew how proud she was—but I guess she was that anxious to get back at me, she didn't care what the folks on the dock thought.

"After that first time, she ran away again two or three times, but she allus come back of 'er own accord—gettin' in to the dock dead tired, with nothin' but a smell of oil in her bunkers. The fuel bill was gettin' to be a pain.

"The next thing that come to plague me was a fool government inspector. Said he'd heard some bad reports and had come to investigate! Well, he had the *Betsy B's* pedigree in a little book, and if you ever saw a worried look on a man, you shoulda seen him while he was comparin' 'er dimensions and specifications with what they was s'posed to be. I tried to explain the thing to him—told him he could come any week and find something new. He was short and snappy—kept writin' in his little

book--and said that I was a-goin' to hear from this.

"You can see I couldn't help the way the *Betsy B* was growin'. But what got my goat was that I told him she had only one boiler, and when we went to look, there was two, side by side, neatly cross-connected, with a stop on each one, and another valve in the main line. I felt sorta hacked over that--it was something I didn't know, even. She'd done it overnight.

"The inspector feller said I'd better watch my step, and went off, shakin' his head. He as much as gave me to understand that he thought my *Betsy B* papers was faked and this here vessel stole. The tough part of that idea, for him, was that there never had been anything like 'er built. I forgot to tell you that before he got there, she'd grown a steel deck over everything, and was startin' out in a big way to be a regular ship.

"I WAS GETTIN' to the point when I wished she'd run away and stay. She kept on growin', splittin' herself up inside into more and more compartments. That woulda been all right, if there'd been any arrangement I could use, but no human would design such a ship. No doors, or ports, or anything. But the last straw was the lifeboat. That just up and took the cake.

"Don't get me wrong. It's only right and proper for a yacht, or anyway, a vessel as *big* as a yacht, to have a lifeboat. She was a hundred and thirty feet long then, and rated one. But any sailor man would naturally expect it to be a wherry, or a cutter at the outside. But, no, she had to have a steam launch, no less!

"It was a tiny little thing, only about ten feet long, when she let me see it first. She had built a contraption of steel plates on 'er upper deck that I took to be a spud-locker, only I mighta known she wasn't interested in spuds. It didn't

have no door, but it did have some louvers for ventilation, looked like. Tell you the truth, I didn't notice the thing much, 'cept to see it was there. Then one night, she rips off the platin', and there, in its skids, was this little steam launch!

"It was all rigged out with the same vine layout that the *Betsy B* had runnin' all over 'er, and had a name on it--the *Susan B*. It was a dead ringer for the big one, if you think back and remember what she looked like when she come outa the navy yard. Well, when the little un was about three weeks old--and close to twenty feet long, I judge--the *Betsy B* shoved off one mornin', in broad daylight, without so much as by-your-leave, and goes around on the outside of my island. She'd tore up so much line gettin' away for 'er night jamborees, I'd quit moorin' 'er. I knew she'd come back, 'count o' my oil tank. She'd hang onto the dock by her own vines.

"I run up to the house and put a glass on 'er. She was steamin' along slow, back and forth. Then she reached down with a sorta crane she'd growed and picked that *Susan B* up, like you'd lift a kitten by the scruff o' the neck, and sets it in the water. Even where I was, I could hear the *Susan B* pipin', shrill-like. Made me think of a peanut-wagon whistle. I could see the steam jumpin' out of 'er little whistle. I s'pose it was scary for 'er, gettin' 'er bottom wet, the first time. But the *Betsy B* kept goin' along, towin' the little one by one of 'er vines.

"She'd do something like that two or three times a week, and if I wasn't too busy, I'd watch 'em, the *Betsy B* steamin' along, and the little un cavortin' around 'er, cuttin' across 'er bows or a-chasin' 'er. One day, the *Susan B* was chargin' around my little cove; by itself, the *Betsy B* quiet at the dock. I think she was watchin' with another gourd thing she'd sprouted in the crow's



nest. Anyhow, the *Susan B* hit that sandbar pretty hard, and stuck there, whistlin' like all get out. The *Betsy B* cast off and went over there. And, boy, did she whang that little un on the koko!

"I'm gettin' near to the end now, and it all come about 'count of this *Susan B*. She was awful wild, and no use that I could see as a lifeboat, 'cause she'd roll like hell the minute any human'd try to get in 'er—it'd throw 'em right out into the water! I was gettin' more fed up every day, what with havin' to buy more oil all the time, and not gettin' much use outa my boats.

"ONE DAY, I was takin' out a picnic party in my other motorboat, and I put in to my cove to pick up some bait. Just as I was goin' in, that durned *Susan B* began friskin' around in the cove, and comes chargin' over and collides with me, hard. It threw my passengers all down, and the women got their dresses wet and all dirty. I was good and mad. I grabbed the *Susan B* with a boat hook and hauled her alongside, then went to work on her binnacle with a steerin' oar. You never heard such a commotion. I said while ago she sounded like a peanut whistle—well, this time it was more like a calliope. And to make it worse, the *Betsy B*, over at the dock sounds off with *her* whistle—a big chimed one, them days. And when I see 'er shove off and start over to us, I knew friendship had ceased!

"That night she ups and leaves me. I was a-sleepin' when the phone rings, 'bout two a. m. It was the night watchman over't the oil company's dock. Said my *Betsy B* was alongside and had hoses into their tanks, but nobody was on board, and how much should he give 'er. I yelled at him to give 'er nuthin'—told him to take an ax and cut 'er durned hoses. I jumped outa my bunk and tore down to the dock. Soon as I could get the danged motor dory

started, I was on my way over there. But it didn't do no good. Halfway between here and there, I meets 'er, comin' out, makin' knots. She had 'er runnin' lights on, legal and proper, and sweeps right by me—haughty as you please—headin' straight out, Yarmouth way. If she saw me, she didn't give no sign.

"Next day I got a bill for eight hundred tons of oil—she musta filled up every one of 'er compartments—and it mighty near broke me to pay it. I was so relieved to find 'er gone, I didn't even report it. That little launch was what did it—I figured if they was one, they was bound to be more. I never did know where she got the idea; nothin' that floats around here's big enough to carry lifeboats."

"Did Dr. Dilbiss ever look at her," I asked, "after she started to grow?"

"That Doc was so hoppin' mad over the Simpkins brat spillin' his 'Oil of Life' as he called it, that he packed up and went away right after. Some o' the summer people do say he went to Europe—made a crack about some dictator where he was, and got put in jail over there. I don't know 'bout that, but he's never been back."

"And you've never seen or heard of the *Betsy B* since?" I queried, purposely making it a leading question.

"Seen 'er, no, but heard of 'er plenty. First time was about three months after she left. That was when the Norwegian freighter claimed he passed a big ship and a smaller one with a whale between 'em. Said the whale was half cut up, and held by a lot of cables. They come up close, but the ships didn't answer hails, or put up their numbers. I think that was my *Betsy B*, and the *Susan B*, growed up halfway. That *Betsy B* could make anything she wanted outa sea water, 'cept oil. But she was smart enough, I bet, to make whale oil, if she was hungry enough.

"The next thing I heard was the time the *Ruritania* met 'er. No question

about that—they read 'er name. The *Ruritania* was a-goin' along, in the mid-watch it was, and the helmsman kept sayin' it was takin' a lot of starboard helm to hold 'er up. 'Bout that time, somebody down on deck calls up there's a ship alongside, hangin' to the starboard quarter. They kept bellerin' down to the ship, wantin' to know what ship, and all that, and gettin' no answer. You oughta read about that. Then she shoved off in the dark and ran away. The *Ruritania* threw a spot on 'er stern and wrote down the name.

"That mightn't prove it—anybody can paint a name—but after she'd gone, they checked up and found four holes in the side, and more'n a thousand tons of bunker oil gone. That *Betsy B* had doped out these other ships: must have oil, and bein' a ship herself, she knew right where they stored it. She just snuck up alongside in the middle of the night, and worked 'er vines in, to where the oil was.

"Things like that kept happenin', and the papers began talkin' about the Wild Ships. They sighted dozens of 'em, later, all named 'Something B'—*Lucy B*, *Anna B*, *Trixie B*, oh, any number—which in itself is another mystery. Where would a poor dumb steam launch learn all them names?"

"You said she was ex-navy," I reminded him.

"That may be it," he admitted. "Well, that's what started the newspapers to callin' 'em the B-Boats. 'Course, I can't deny that when they ganged up in the Gulf Stream and started in robbin' tankers of their whole cargo, and in broad daylight, too, it was goin' too far. They was all too fast to catch. Commodore What's-his-name just had to sink 'er, I reckon. The papers was ridin' him hard. But I can tell you that there wasn't any real meanness in my *Betsy B*—spoiled maybe—but not mean. That stuff they printed 'bout the octopuses on the bridges, with long danglin' tentacles wasn't nothin' but that gourd brain and vines grewed up."

He sighed a deep, reminiscent sigh, and made a gesture indicating he had told all there was to tell.

"You are confident, then," I asked, "that the so-called B-Boats were the children of your *Betsy B*?"

"Must be," he answered, looking down ruefully at his patched overalls and shabby shoes. "'Course, all I know is what I read in the papers, 'bout raidin' them tankers. But that'd be just like their mammy. *She* sure was a hog for oil!"

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### The Analytical Laboratory

When this department was started, I promised I'd report any item that got either unusual praise or unusual panning. Herewith I report both. Maiden Volage, by Vic Phillips, was praised strongly and consistently. I was sure it would be, because it was good. Blue-Men of Yrano, on the other hand, took an outstanding shellacking. At the present reading it has a score of minus 23 points. I apologize. But sometimes it's hard—when a story depends on putting over a feeling—to tell whether it puts it over or not. The answer—your answer—on that one was, definitely, not. The first five places were distributed as follows:

1. Maiden Voyage
2. Nuisance Value
3. The Incurrigible
4. Saurian Valedictory
5. Mill of the Gods

Vic Phillips  
Manly Wade Wellman  
L. Sprague de Camp  
Norman L. Knight  
Malcolm Jameson

The Editor.

# PROBLEM IN MURDER



BY H. L. GOLD

## “PROBLEM IN MURDER”

*Gilroy, the reporter-detective, follows the trail of the butcher-murderer to a strange little “criminal.”*

GILROY spread the office copy of the *Morning Post* over the editor's desk and stared glumly at the black streamer. The editor was picking at his inky cuticles without looking at them; he watched Gilroy's face.

“Twelfth ax victim found in Bronx,” Gilroy muttered to himself. “Twelve—in two weeks, and not a single clue.”

The editor started. He drew in his breath with a pained hiss and yanked out a handkerchief to dab at a bleeding finger. Gilroy raised his enormously long, gaunt head, annoyed.

“Why don't you get a manicure, chief? That nail-picking of yours is getting me too used to the sight of blood.”

The editor ignored him. He wrapped the handkerchief around his finger and said: “I'm taking you off the torso story, Gilroy. What's the difference who goes down to headquarters and gets the police handout? You gotta admit it yourself—outside of the padding, your stories are exactly the same as any of the other papers'. So why should I keep an expensive man on the job when any cub can do as well, and there're other stories waiting for you to tackle them?”

Gilroy sighed resignedly and sat down. He sighed again and stood up, going behind the editor's desk to the window that looked over the dark river to the lights in Jersey. His incredibly ugly, sharply hewn face twisted thoughtfully at them.

“I get the point, chief. Sure; so far you're right. But, hell!” He wheeled swiftly. “Why can't we do anything by ourselves? Do we *have* to get our handouts from the cops? How about us doing some work! Aw, chief—will

you leave that finger alone before I have a stroke?”

The editor looked up hastily, although his thumb continued to caress the bleeding cuticle. “How you gonna do your own detecting?” he demanded. “You—and no other reporter either—ever got near enough the victims to give an eyewitness description of what they looked like. The cops won't even let you take a peek. They find an arm or a leg, all wrapped up in brown grocery bags; but did you ever see them? All night long they got radio cars riding up and down the Bronx, but pretty nearly every morning they find arms or legs. Well, Sherlock, what're you gonna do by your little self when the cops can't stop the murders?”

“Yeah. Getting a look at the chopped-off limbs is the main thing,” Gilroy said, shuffling around slowly to the front of the desk, his hands in his pockets, his head down, and his wide mouth pursed. He was amazingly thin, even for a reporter, and within inches of qualifying as a circus giant. In his stooping position he resembled a furred umbrella. “Why don't the flatties give us a squint? There'd be more chance of identification. Maybe not much more, but more, anyhow.”

The editor shrugged and went back to his cuticles.

Suddenly Gilroy raised his head. He stared piercingly at the editor. “If we use our heads, we *can* see one of those limbs!”

“Yeah?” the editor asked, mildly skeptical. “How?”

“Well, the bulldog edition's just hitting the stands. The final hasn't been put to bed yet. Suppose we insert a

reward for finding one of the legs, arms, or whatever the next one'll be, and bringing it here. Tell me *that* wouldn't get results!"

The editor stuffed a sheet of paper into his typewriter. "How much should I make it for—two hundred and fifty? The board'll have time to clear it after they see the results."

"Two fifty!" Gilroy strangled. "I can think of ten people I'd cut to pieces for less. Make it, say, about fifty bucks—a hundred tops. But they got to bring it here and let us take care of the cops."

The editor nodded and typed hurriedly. "Compromise—seventy-five," he said. "And I got a swell spot for it. I'm dropping the subhead on the ax yarn, and this goes there in a black border. How's that?"

"Swell!" Gilroy grinned and rubbed his huge bony hands together. "Now, if the internes'll only stay out of this, maybe we can grab off an exclusive. Anyhow, I'm going up to the Bronx and look around myself."

The editor leaped out of his chair and grabbed Gilroy's lapel. "The hell you are! I've kept my men out of there so far, and they're staying out until the reign of terror is over. Don't talk like an ass. How'd you like to find yourself hacked to pieces, and all the cops are able to find is an arm or a leg? You're not going, Gilroy. That's that!"

"O. K., chief." Gilroy assumed a mournful expression. "Me no go."

"And I'm not kidding either. I'm no coward—you know that; but that's the one place I wouldn't mess around in. The cops up there're scared witless. If the maniac doesn't get you, they will, with a couple of wild shots. Don't go up there. I mean it!"

GILROY GOT OFF the subway at 174th Street on the Grand Concourse, and walked south along the wide, bright highway. Traffic sped north, south and east, but none of it turned west into the

terror district. He met no pedestrians. The police had been taken off their beats along the Concourse to patrol the dark side streets.

Riding up to the eastern boundary of the danger area, Gilroy had reasoned approximately where he would stay during the night. Dismembered limbs had been found as far north as Tremont Avenue, as far south as 170th Street, west to just short of University Avenue, and east almost to the Concourse. The geographical center of the area would be a few blocks west of the elevated station at 176th Street and Jerome Avenue, but Gilroy knew it was too well patrolled for the murder.

He entered an apartment house. The Concourse at that point is about forty feet above the surrounding streets. He took the automatic elevator down five stories to the street level and walked boldly toward Jerome Avenue. His hands were out of his pockets, ready to shoot over his head if a policeman challenged him. But if anyone in civilian clothes were to approach, his astoundingly long, lean legs were tense to sprint an erratic course, to dodge bullets.

Several times he crouched in shallow doorways or behind boulders in lots when he caught sight of policemen, who always traveled in pairs. He realized how helpless they were against the crafty murderer, and why, in spite of their vigil, murders had been committed at the rate of one a night, excepting Sundays, for the past two weeks. He, a reporter, not particularly adroit in skulking, found very little difficulty in getting through the police cordon to Jerome Avenue and 174th Street!

He looked carefully before crossing under the elevated; when he saw that the road was completely deserted, he raced from post to post, across to a used-car lot. While he was still on the run, he chose a car slightly to the front of the first row, flung open the door, and crouched down on the floor. From that

position, with his eyes just above the dashboard, he had a relatively clear view of the avenue for blocks each way.

He made himself comfortable by resting against the panel. From time to time he cautiously smoked a cigarette, blowing the smoke through the hood ventilator. He was not impatient or in a hurry. The odds were that spending the night in the car would be fruitless; only by an off chance would the murderer happen to pass. But even so, it was better than merely waiting for official police bulletins, and there was always the hope that perhaps the maniac *might* slink by him.

Gilroy relaxed. His eyes did not. Automatically, they peered back and forth along the empty, shadowy avenue.

He wondered whether the murderer got his victims. All through the terror area, only policemen traveled in pairs. House doors were locked. Stores were closed. People getting off from work after dark stayed at hotels rather than go home through the night with horror on their heels. After the first murders, taxi drivers could be bribed to enter the area; now they refused fantastic tips, grimly, without regret. Elevated trains roared overhead. They carried few passengers, none getting off here.

Even Gilroy could sense the cloyed atmosphere, the oppression of lurking, ambushed horror. Through those streets, where terror hid and struck, paired policemen walked slowly and fearfully, afraid of somehow being separated—hundreds of police, every available man—watchful as only deathly frightened men can be.

Yet in the morning another victim would be found somewhere within the borders of the danger area—only a limb or part of a limb; the rest of the body would never be found nor identified.

That was another angle that Gilroy found particularly puzzling. Obviously the murderer had some superperfect method of disposing of the bodies. Then

why did he casually leave a limb where it could easily be found after each murder? Was it bravado? It must have been, for those dismembered limbs could have been disposed of even more easily than the rest of the bodies. But by destroying them, the murderer could have committed his crimes for an indefinite length of time, without detection.

IT WAS long after midnight. Gilroy fished a cigarette out of an open pack in his pocket. For only an instant he bent under the dash to hide the match's flare. When he straightened up—

A man was walking north along the avenue! A man in a topcoat too large for him, a hat that shadowed his face, a small package in his left hand—

He halted. Gilroy could have sworn that the halt was indecisive. He raised the package and looked at it as if he had just remembered it. Then he dropped it at the curb, near a box of rubbish. He walked on.

Gilroy clutched the door handle. Cursing, he stopped turning it before it opened. A white-roofed police car cruised slowly northward; Gilroy knew that the passenger cop rode with his gun resting alertly on the open window panel.

For a moment he calculated his chance of dashing swiftly across the avenue, scooping up the bundle and following the murderer before he escaped. But Gilroy sat tensely, biting furiously and impotently at his lip. It would be like running out of a bank at noon.

The elevated pillars hid his view of the corner toward which the murderer had strolled. But when he did not cross into Gilroy's line of vision, the reporter knew that he had turned up that street.

At that point the police car drew abreast, and Gilroy saw the men inside scrutinize every doorway, every shadow behind the posts, the dark lot he was hiding in—

And then they rode past without seeing him. When they reached the cor-



ner, Gilroy's hand tightened convulsively on the door handle. They did not accelerate suddenly up that street. Gilroy relaxed and opened the door stealthily. The murderer must have vanished.

Gilroy crouched and scuttled to the nearest pillar, like a soldier running under gunfire. He stood there until he was certain that no one had seen him. Then he darted from post to post, to one that stood opposite the abandoned parcel.

Only an instant he stopped. In the next second he had snatched it up, on the run, and huddled against a wall, hugging the bundle under his arm. He edged swiftly along the building to the corner where the maniac had disappeared.

Nobody was there, of course. But he broke into a long-limbed sprint, stuffing the bundle into his belt under the loose jacket where it could not be seen. At the corner he slowed to an unsuspecting walk.

It was lucky that he did so. Two policemen in the middle of the northwest block shouted for him to halt, came running with drawn guns—

He stopped and waited, his hands ostentatiously above his head. When they reached him, they covered him from both sides.

"Who the hell're you?" one barked nervously. "Why're you out?"

"Gilroy, reporter on the *Morning Post*. You'll find a wallet with my identification papers in my inside breast pocket. I'm unarmed."

Brutally, to cover his intense fear, the cop at his left tore the wallet out and held the papers to the street light. He passed them to his comrade.

"All right," the second growled in unabashed relief, "you can put 'em down, you damned, lousy half-wit. Come snoopin' around up here and scare the living hell out of us!"

"Next time," the other swore, "so help me, I'm gonna plug anything that

moves. I don't care if it's the mayor himself. I'll find out who it is later. Anybody who's crazy enough to come up here where he don't belong don't deserve no better!"

"We got all we can do to keep from shootin' each other when we pass another beat. Why don't you stinkin' reporters have a heart?"

Gilroy grinned. "Now, now, boys. It's only your nerves. All you have to worry about is an ordinary maniac. But I need a story!"

The first policeman ripped out a blast of curses. "Cut it out, Joe," the other said, as quietly as possible. "We'll boot this lug onto the el and report his paper to the commissioner. That'll fix him."

They expected Gilroy to cringe before that threat. It would mean being denied official police bulletins. But as they strode silently toward the elevated station, Gilroy's forearm pressed reassuringly against the brown paper bundle, inside the top of his pants. Bulletins—*huh!*

AT FIVE after nine the next morning, Gilroy and his close collaborator, the night editor, were roused from their respective beds and ordered to see the police commissioner immediately. They met outside his office.

"What's up?" Gilroy asked cheerily.

"You should ask," the editor grumbled. "Your idea backfired."

"Come on, you two," a police clerk called. "Get inside."

"Here it comes," the editor said resignedly, opening the door that led to the Jehovahesque presence of Police Commissioner Major Green.

The city had revolted against a reform administration, because of the high taxes needed for vital slum clearance; then against a businessmen's administration, because the high taxes remained without social projects being completed; and in desperation had elected a ticket of retired reserve army officers who had

an extremely vague idea of civil rights.

Major Green pushed back from his desk and stabbed them with a hostile glare. "You're from the *Morning Post*, eh?" he barked in clipped military tones. "I'm being easy with you. Your paper campaigned for my election. Take that reward offer out and put in a complete retraction. I won't press for suspension of publication."

The editor opened his mouth to speak. But Gilroy cut in sharply: "That sounds like censorship." He fished out a cigarette and lit it.

"Damn right it does," Major Green snapped. "That's just what it is, and the censorship is going to stay clamped on tight just as long as that maniac in the Bronx keeps our citizens terrified. And put out that cigarette before you get thrown out."

"We don't want to fight you, com-mish," Gilroy said, speaking with deadly deliberation around the cigarette that dangled uncharacteristically from the corner of his mouth. "If we have to, of course, we're in a much better position to fight than you are. Our newspapers'll take on only self-imposed censorship—when they think it's to the public's advantage."

Green's cold eyes bulged out of his stern face. Rage flushed every burly inch. Independently of his tense arms, his fingers clawed the desk.

"Why don't you shut up, Gilroy?" the editor hissed viciously.

"Gilroy, eh? That's the rat who sneaked inside the cordon—"

"Why should I shut up?" Gilroy broke in, ignoring the commissioner. "Ask him what he's done these last two weeks. Don't. I'll tell you.

"He's the only one in the police department who's allowed to make statements to the press. Reporters can't interview cops or captains; they can't even get inside the danger area at night—unless they try. He forces retractions on papers that step out of line.

"Well, what good has it done? He hasn't identified a single victim. He can't find the rest of the bodies. He doesn't know who the murderer is, or where he is, or what he looks like. And the murders're still going on, every night except Sunday!"

"Don't pay any attention to him, sir," the editor begged.

"I expect an arrest in twenty-four hours," Green said hoarsely.

"Sure," Gilroy's clear baritone drowned out his chief's frightened plea. "For the last two weeks you've been expecting arrests every twenty-four hours. How about giving us one? And I don't mean some poor vag picked up on suspicion.

"I'll give you a better proposition. You've been feeding us that line of goo because you don't have anything else to say. Most of the papers didn't even bother printing it after the first week.

"First of all, let us say anything we want to. We're not going to tip off the maniac. We do our own censoring, and we do it pretty well. Then, let us inside the danger zone with official recognition. We get inside anyhow, one way or another; but there's always the danger of being plugged by your hysterical cops. Finally, let us see the dismembered limbs and photograph them if we want to. Isn't that simple? And you'll get a lot further than you are so far."

Trembling, Major Green stood up, his craggy face shrunken into angles and creases of fury. He pushed his chair away blindly. It toppled and crashed, but he did not hear its clatter.

He caught up the telephone. "I'm—" He strangled and paused to clear his clogged throat. "I'm handling this my own way. I live up in the terror area with my wife and three kids. I'll tell you frankly—every night I'm afraid I'll go home and find one of them missing. I'm scared stiff! Not for myself. For them. You'd be, too, in my place.

"Here's my answer, damn you!" The

telephone clicked and they heard a shrill metallic voice. "Get me Albany—the governor!"

Gilroy avoided the editor's worried eyes. He was too concerned with Major Green's reason for calling Albany.

"This is Major Green, sir, police commissioner of New York City. I respectfully urge you to declare martial law in the Bronx danger district. The situation is getting out of hand. With the mayor's permission, I request the national guard for patrol duty. The confirmatory telegram will be sent immediately. . . . Thank you, sir. I appreciate your sympathy—"

He clapped down the receiver and turned to them grimly. "Now see if you can squeeze past the militia sentries on every corner in the territory. There'll be a sundown curfew—everyone indoors for the rest of the night.

"Martial law—that's the only answer to a maniac! I should have had it declared long ago. Now we'll see how soon the murders'll stop!

"And," he stated menacingly, "I still want that retraction, or I'll get out an injunction. Fall out!"

IN UTTER gloom, the editor went through the outer office.

"Pretty bad, chief," Gilroy said grudgingly. "We could slip past the police cordon. Napoleon couldn't patrol every street before, but the militia can put a sentry on every corner. It doesn't matter, anyhow, so I guess you'd better print a retraction."

The editor glared. "Really think so?" he asked with curt sarcasm.

Gilroy did not reply. In silence they walked out of the office.

"Well, let's not take it so hard," the editor said finally. "He was going to declare martial law anyhow. He was just looking for an excuse. It wasn't our fault. But, just the same, that nipplehead—"

"Lousy nipplehead is the term, chief," Gilroy amended.

When they reached the elevator, the switchboard operator called out: "You from the *Morning Post*? They want you down there right away."

They stepped into the elevator. The editor hunched himself into his topcoat collar. "The louse must have called up the board," he said hollowly. "Here's where we get hell from the other side."

Defeated, he hailed a taxi, though he was not in a hurry. Gilroy gave his Greenwich Village address. The editor looked up in surprise.

"Aren't you coming with me?" he asked anxiously.

"Sure, chief. I want to get something first."

At the apartment house, the editor waited in the taxi. Gilroy went upstairs. He took the brown grocery bag out of the refrigerator and made a telephone call.

"Willis, please." He held the wire until he was connected. "Hello. Gilroy speaking. Anything yet, Willis? . . . No? . . . O. K. I'll call later."

He went down with the package in his pocket. As they rode downtown to the newspaper building, Gilroy said, for the first time with concern on his face:

"If declaring martial law'd help, I wouldn't mind, even though it means giving that stiff-necked ape credit for brains. But this ax murderer'll only be scared off the streets; and when martial law'll be lifted, he'll go right back to work again. Green won't get him that way. He's got to be outfoxed. And he's plenty sly."

The editor remained silent. From his set, dazed expression, Gilroy knew he was thinking of a terse note in his pay envelope. Gilroy did not have to worry about his job; he might have to take less than he was getting at the moment, but he could always manage to get on a paper. The editor, though, would have to start again as a legman, and that

would completely demoralize him.

"Aw, don't let it get you down, chief," Gilroy said as they stepped out of the taxi at the *Morning Post* building. "If I have to, I'll take the whole rap. I'll say I forged your initials to the print order. Anyhow, they're only going to warn us. You know—'A newspaper can't afford to antagonize its sources of information. Make an immediate retraction and don't let it happen again.'"

The editor nodded, unconvinced. Under board orders, Major Green had been the *Morning Post's* pet candidate in the election campaign.

The day shift in the newsroom greeted them much too heartily. Gilroy recognized the ominous symptom. He had often discovered himself being overcordial to reporters about to be fired.

They entered the city editor's office. When he saw them, the city editor shook his head pityingly.

"You boys certainly started something. The board's sore as hell. They're holding a special meeting right now—"

The night editor stuffed his hands into his pockets and turned away.

"Sit down, boys. It might take some time before they cool off enough to be able to speak distinctly."

"Cut out the funeral march, boss," Gilroy said sharply. "You and the chief can soothe them. And even if Green cuts us off the official bulletin, we still can get along. Take a look at this!"

He had taken the parcel out of his pocket and put it on the desk. He ripped off the brown grocery bag.

"It's a foot!" the city editor cried.

"A woman's foot!" the night editor added, horrified. "Cut off at the ankle. Ugh!"

THE CITY EDITOR yanked the telephone toward him. Gilroy held down the receiver grimly. "I'm not calling the cops," the editor explained. "I'm sending for a photog."

"Not yet," Gilroy stated flatly. "It's

not as simple as that. Take a look at the foot first." He picked it up callously and showed them its sole. "See what I see? The skin is perfectly even—unthickened even at the pressure points. Not a corn or callus, toe joints straight—"

"So what?" the city editor demanded. "She could've worn made-to-order shoes. Maybe she was perfectly fitted all her life."

"Shoes aren't made that way," Gilroy retorted. "They've got to prevent the foot from spreading somewhat or else they won't stay on, so there are always points of contact that cause callus. Even if she'd walked barefoot on rugs all her life, there'd still be a tiny thickening."

The city editor pursed his mouth and stared. He had not imagined so much trouble from a simple ax murder. The night editor looked fascinatedly at the foot, picking blindly at his cuticles.

"Suppose she was a cripple or a paralytic," the city editor said.

"The muscles aren't atrophied. But for some reason or other, this foot never walked."

He removed the telephone from the city editor's unconscious grasp and called Willis again. When he had finished speaking, his face was grave. He picked up the foot again and pointed to an incision.

"I cut out a piece of muscle in the heel with a safety razor," he said, "and brought it to the chemist at Memorial Hospital. I made the incision because I knew she wasn't a paralytic. Muscles contain glycogen and glucose, the sugar derived from the glycogen. When you move a muscle, the energy to do it comes from burning the glucose, which turns to lactic acid. Even if she'd been a complete paralytic—hadn't moved in years—there'd still've been a minute quantity of lactic acid."

"What'd he find?" the night editor asked.

"Not a trace of lactic acid! Chief—get Green on the telephone and find out what time the national guard'll be at their posts."

The night editor was accustomed to Gilroy's unexplained hunches. He quickly got an outside wire. "Major Green? . . . *Morning Post*. What time will the militia be in the Bronx? . . . Five o'clock? . . . Quick work. . . . Thanks."

"Wow!" Gilroy shouted. "Stay here, chief. I've got to find him before Green clamps down his martial law, or he'll be shot or arrested!"

In half the number of strides it would take a normal man in a normal state of mind, he was at the elevator, ringing furiously.

The city editor could not keep up with Gilroy's mental pace. "What the hell was he talking about? Who'll be shot or arrested—the maniac?"

"I guess so," the night editor replied, unworried, absolutely confident in Gilroy. "Who else could he mean? I guess he's going up to the Bronx to find him."

BUT GILROY did not go to the Bronx. His first stop was at the Forty-second Street Library. Rapidly, yet carefully, he flipped through the index files on every subject that might be a clue. He eliminated hundreds of titles; even so he had to write out dozens of slips.

The man at the pneumatic tube was not astonished by the bundle of slips shoved viciously at him. "Another case, Mr. Gilroy?" he asked.

"Yeah," the tall reporter growled. "A pip."

In the south hall he appropriated an entire table on which he spread his books as quickly as they came up from the stacks. He scanned the contents pages, occasionally going through a chapter for more detailed information; wherever necessary, he looked through the indices

of books that seemed to hold the key. A long sheet of foolscap swiftly became crowded with names.

He groaned at the clock. It was almost noon when he requested the city directory and a map of the Bronx. It was not very recent, but he was certain that the man he sought had lived in the same house for some time. With his ponderous equipment, he would have to, Gilroy reasoned.

He went through the enormous Bronx directory, eliminating every one of his references who did not live in the danger area. When he had finished, it was twenty to one, and there was not a single name left for him to investigate. He had eliminated all of them; not one lived in the district where terror reigned.

And he had only four hours and twenty minutes before that area would be under martial law—when it would be too late!

THE TWO EDITORS listened sympathetically, but they had no plan to offer. Gilroy scarcely heard them tell how they had soothed the board of directors. He was too frantically engaged in thinking.

How do you track down one man out of a city of nearly eight million? You don't know his name, what he looks like, where he came from, what he did before, who knew him. You only know that he lives in a mile-square territory, containing perhaps a hundred thousand people.

Gilroy did not have to ignore the city editor's persistent questioning. The night editor had quieted him to a glowering sulk by telling him that Gilroy would explain when there was no danger of being made a fool by a wild intuition.

"If we had block spies, like they have in Europe," Gilroy muttered, "we'd have had him long ago. But then he'd have been executed for doing something he didn't do. Well, three and a half

hours to save the poor lug. How do I go about finding him?"

If he could interview every person in that mile-square district, he could easily find the man. Gilroy dismissed the idea. It was fantastic. But suddenly his eyes sparkled and he grinned at the night editor.

"Chief, I've got to make a canvass of the danger area. Will you back me? I've never let you down so far. Where do we get the dough to hire Peck, the ad distributors?"

The night editor writhed in his chair. He picked at his cuticles and his foot tapped nervously. "Special requisition," he said dully.

"Oh, no!" the city editor stated flatly. "I'm not writing it!"

"You don't have to. I'll do it."

Gilroy and the city editor realized the anguish that the night editor had gone through in making his resolution to back Gilroy. The business staff looked cock-eyed at every expenditure, even routine ones; and this requisition, based on an unexplained hunch, they could not justify, even to themselves.

"O. K.," Gilroy said in a low, respectful voice. "I'll call Peck and ask for their rates." Reverently, in a manner befitting the night editor's gallant sacrifice—possibly of his job—Gilroy made a ritual of dialing. "Peck? . . . *Morning Post*. Can you interview everyone in the territory between the Grand Concourse and University Avenue, from 170th Street to Tremont Avenue, in an hour and a half? . . . Good. How much will it cost? . . . Cheap enough. I'll be right down with a check and a questionnaire."

He waited until the night editor wrote out the requisition, watching sympathetically the whitened, trembling fingers as they scrawled out the numerals. At each figure Gilroy knew that those fingers were trying to rebel against their violation of conditioning.

GILROY SQUIRMED impatiently in the squad captain's car. It was too much for him to sit by and merely watch the men going in and out of buildings. All over the danger area Peck investigators were ringing doorbells and calming down the terrified inhabitants enough to open their doors.

"I can't sit here," Gilroy protested. He opened the door. "I'm going to cover a few streets myself."

The squad captain restrained him politely. "Please, Mr. Gilroy. The whole territory has been mapped out. Each man's beat dovetails with the next one's. You'll only throw them off their stride."

Gilroy subsided, grumbling furiously. He knew that the men were working with maximum efficiency, yet he could not help feeling that his own efforts would speed them up, perhaps inspire them.

Each investigator had a hard-cover notebook in which to write the answers he received. The books were divided into sections—four fifths for "ignorance," one tenth for "no," and the other tenth for "yes."

Gilroy's facile imagination could picture the astonishment his men's questions could cause: "I don't know what you're talkin' about, mister." "Sorry. We don't want any." "*Hah?*"

For a short while he amused himself with various fancied interviews; then he went back to cursing the men's slowness. In spite of his pessimism, the job was finished in the specified hour and a half, and the crew met at the squad captain's car, parked in the center of the district.

Gilroy eagerly collected the filled notebooks. "Send them home now," he said to the squad captain. "But there's ten bucks in it for you if you drive me around to these addresses."

He had been amazed to find so many affirmative answers. With the captain's help he organized the addresses into a route. As they rode to the first, Gilroy



# BRITISH AMBASSADOR TO VIENNA VANISHES IN PLAIN SIGHT

Nov. 25, 1809

ZEPPELIN HINDENBURG WRECKED  
BY WEIRD COLORED LIGHTS  
July, 1937

5,436-TON VESSEL, WITH  
CREW OF 38, VANISHES  
IN CALM SEA  
May 16, 1938

CAN NEGRO EYE SEE  
BEYOND VISION  
Herald-Tribune

HERD OF CATTLE MADDENED  
BY MYSTERIOUS FEAR  
Herald-Tribune

DOGS FRIGHTENED BY  
MYSTERIOUS NOTHING  
Herald-Tribune

COLORED LIGHTS  
SEEN OVER ISLE  
OF MAN  
Feb., 1938

MYSTERIOUS COLLIERY EXPLOSION  
CAUSED BY STRANGE LIGHT  
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saw evidence of the terror that part of the Bronx lived in. Normally, children played noisily in the street, women sat on folding chairs on the sidewalks, delivery men made their rounds. But all was silent, deserted; frightened faces peered through drawn curtains.

At the first he rang cheerfully. A young man cautiously opened the door, which was held by a newly installed chain.

"An investigator was here a short while ago," Gilroy said, speaking through the narrow crack. "You answered his question affirmatively."

The youth suddenly brightened. "That's right. I've been interested in the problem ever since I began reading science fiction. I think—"

It was a matter of some minutes before Gilroy could escape and go to the next address. There he had less trouble escaping; but after several stops he lost his temper.

"These damned science-fiction fans!" he snarled at the startled squad captain. "The place swarms with them. They've got to explain everything they know about the subject and ask what you think and why you're going around getting opinions. I've got about a hundred and fifty addresses to investigate, all in less than an hour—and probably a hundred and forty-nine of them are science-fiction readers!"

At the seventeenth name he stopped abruptly. "This isn't getting me anywhere. Lay out the rest of these addresses in a spiral, starting from the middle of this territory."

The squad captain reorganized the route. They sped to the center of the danger area; and once again Gilroy began ringing doorbells, this time with a growing lack of cheerfulness as he eliminated one science-fiction fan after another. They were all scared to death of opening their doors; they made him wait until they did; and then he couldn't get away.

He came to a street of private houses. Immediately his enthusiasm returned. Inventors and experimenters are more likely to live in their own homes than in apartment houses. Landlords are not very hospitable to the idea of explosions, which, in their minds, are invariably connected with laboratory equipment. Then again, apartment houses hold room space at a premium, and scientists need elbow room.

He had only one address to investigate in this entire street of ultrarespectable, faintly smug one-family houses, each identical with the one next door, each nursing its few pitiful square yards of lawn.

But Gilroy felt exceedingly hopeful when he stopped at the proper house and looked up at the dingy curtains, unwashed windows, and the tiny lawn, absolutely untouched in all the years it had been there. Only a scientist, he felt, could be so utterly neglectful. Gilroy was so certain he had come to the end of the trail that, before he left the car, he paid the squad captain and waited until he drove off.

Almost jauntily, then, he rang the bell. When there was no answer, he rapped and waited. He rang a trifle more insistently.

Suddenly children, no longer white-faced and terrified, came dashing happily out of houses for blocks around. Gilroy wheeled in alarm. They were screaming: "Sojers! A parade—yay!"

IN PANIC, Gilroy glanced at his watch. It was a quarter to five, and from Jerome Avenue detachments of militia marched along the street, pausing at street corners to post armed guards. When they fell into step and approached Gilroy, the street crossing had four bayoneted sentries.

Gilroy stopped his polite ringing and tapping. His left thumb jabbed at the bell and stayed there; his right fist battered away at the door. And the militia

marched closer, more swiftly than Gilroy had ever suspected heavily armed men could walk. The officer stared directly at him.

Just then the door opened and a small, wrinkled, old face peered up at him. The watery eyes behind their thick glasses gazed into his with infinite patience and lack of suspicion.

"Professor Leeds?" Gilroy snapped out. The old man nodded, the webs around his weak eyes wrinkling expectantly, utterly trustful. Gilroy did not look back over his shoulder. He could hear that the guard was nearly abreast now. "May I come in?" he demanded abruptly.

His tall form blocked the soldiers from Professor Leeds' view. The old man said, "Of course," and held the door wide. Gilroy hastily barged into a small dark space between the outer and inner doors. Leeds was saying apologetically: "I'm sorry I was so late answering the door; my servant is ill and I had to come up from my laboratory in the cellar."

"An investigator was here today," Gilroy broke in. "He asked you a question. You answered in the affirmative."

For the first time the old man's eyes clouded, in bewilderment, not suspicion. "That's true. I wanted to discuss the problem with him, but he merely wrote something in a notebook and went away. I thought it was very odd. How do you suppose he knew?"

Without answering or waiting for an invitation, Gilroy strode through the hall to the front room, with the professor pattering behind.

Another old man, considerably more ancient than Leeds, sat at the window in a wheel chair. He turned at their approach. Gilroy suddenly felt uncomfortable under his keen, distrustful scrutiny.

But Leeds still asked, gently persisting: "How do you suppose he knew

that I was experimenting with synthetic life?"

"Shut up, professor!" the old man in the wheel chair shrieked. "Don't you go blabbin' everythin' you know to no international spy like him. That's what he is, a-snoopin' and a-pryin' into your affairs!"

"Nonsense, Abner." Leeds faced Gilroy. "Don't pay any attention to him. You're not a spy, are you, Mr. . . . uh—"

"Gilroy. No. I came here—"

"He brought me up from a child. I know he doesn't like to hear this, but his mind isn't what it used to be. He's a nasty-minded old crank."

Abner drew in his creased lips with a hiss of pain. Then he rasped: "No spy, huh? Why's he bustin' in with them sojers on his heels?"

"That's the point, boys," Gilroy said. He shoved his battered hat off his angular brow and sat on a plush sofa that was red only in isolated spots. Most of the nap had come off on countless pants, dust had turned it to a hideous purple, and a number of its springs coiled uselessly into the air. "Sit down, please, professor."

Leeds sat in the depths of a huge Morris chair and folded his hands.

"You *are* trying to synthesize life, aren't you?"

The professor nodded eagerly. "And I almost have, Mr. Gilroy!"

Gilroy leaned forward with his elbows on his high knees. "Do you read newspapers, professor? . . . I mean, lately?"

"I have so much to do," Leeds stammered, his lined, transparent skin flushing. "Abner neglected his diabetic diet—gangrene set in—and his leg had to be amputated. I have to do all the cleaning, cooking, shopping, buy my material and equipment, take care of him—"

"I know," Gilroy interrupted. "I figured you didn't read the—"

He stopped in amazement. The professor had creaked to his feet and rushed

to Abner's side, where he stood patting the old servant on the shoulder. Tears were squeezing out of Abner's eyes.

"Ain't it bad enough I can't do nothin'," the old man wailed, "and I gotta let you take care of me? You're plumb mean, talkin' 'bout it!"

"I'm sorry, Abner. You know I don't mind taking care of you. It's only right that I should. Wouldn't you do it for me?"

Abner wiped his nose on his sleeve and grinned up brokenly. "That's so," he admitted. "Reckon I must be git-tin' into my second childhood."

LEEDS returned to his seat, confident that Abner was pacified, and looked expectantly at Gilroy. "You were saying—"

"I don't want to scare you, professor. I'm here to help you."

"Fine," Leeds smiled, with absolute trust.

"You watch that there slicker," Abner whispered hoarsely.

"You made several limbs and at least one foot, didn't you?" Gilroy asked. "You weren't satisfied with them, so you threw them away."

"Oh, they were no good at all, complete failures," Leeds confided.

"Let's leave that until later. No doubt you had good reasons for discarding the limbs. But you just threw them away in the street, and people found them. Now the people up here're afraid of being murdered and hacked to pieces. They think those limbs were chopped off corpses!"

"Really?" Leeds smiled tolerantly. "Isn't that silly? A few simple tests would prove that they never lived."

"I made a couple of those tests," Gilroy said. "That's how I found out that they were synthetic limbs. But you won't convince the cops and these people up here that they were. So now there's martial law in this part of the

Bronx, with soldiers posted on every corner."

Leeds stood up; he shuffled back and forth, his hands twisting anxiously behind his back. "Oh, dear," he gasped. "My goodness! I had no idea I would cause so much trouble. You understand, don't you, Mr. Gilroy? I was experimenting with limbs, studying them, before I felt I was ready to construct an entire synthetic human being. The limbs were highly imperfect. I had to dispose of them somehow. So, when I went out for walks at night, I wrapped them up and threw them away. They seemed so imperfect to me. They scarcely looked human, I thought—"

Abner's mouth had dropped open in astonishment. He compressed it grimly and said: "You gotta clear yourself, professor. You're the first Leeds that anybody ever called a murderer! Go out and tell them!"

"Precisely." Leeds walked purposefully toward his topcoat, draped over a sagging grand piano. "Dear me—I had no idea! I know just how the people feel. They must think I'm just a common Jack the Ripper. Please help me with my coat, Mr. Gilroy. I'll go right down and explain to the authorities that it was all a terrible mistake; and I'll bring a synthetic limb with me as proof. That will clear everything up."

Abner bounced excitedly in his chair. "Atta boy, professor!"

"Wait a minute," Gilroy said sharply, before the situation could get out of hand. He snatched the coat and held it tightly under his arm. "You'll be stopped by the sentries. They'll search you. Most of them're green kids out on what they think is a dangerous job—getting a bloodthirsty maniac. If they find a synthetic limb on you, bullets're liable to start flying—plain nervousness, you know, but in the line of duty."

"Heavens!" Leeds cried. "They wouldn't actually shoot me!"

"They might. But suppose they let you through—

"You'd come up against a police commissioner who hates to have anyone prove he's a fool. He's drawn hundreds of cops off their regular beats to patrol this section. Luckily he didn't catch you. So he had to have martial law declared. The papers've been giving him hell, demanding the maniac's arrest. He's jittery. His reputation's at stake.

"Then you come in telling him that the limbs were synthetic, that there weren't any murders. Why, he'd perjure himself and line up hundreds of witnesses to prove that you were the murderer. He'd take your own confession and twist it to prove that you were cutting people up to study them. Don't you see? . . . He's got to solve these murders, but he's got to solve them the right way: with someone in the electric chair!"

Leeds dropped into a chair. His watery eyes clung to Gilroy's, frankly terrified. "What shall I do?" he begged in scared bewilderment.

The reporter had to escape that pleading, frightened stare. He gazed down at the charred fireplace. "Damned if I know. Anything but explaining to Major Green. *Anything* but that!"

"He's right, perfessor," Abner chattered, fearful for his master's life. "I know them durned coppers. Don't care who they send to the chair, long's they got somebody to send there so's they get the credit."

At that point Leeds broke down. Babbling in horror, he shuffled swiftly out of the room. Gilroy leaped after him, along the hall and down to the cellar.

HE HEARD sobbing in the basement laboratory. He clattered down the steps. He was surrounded by shelves of canned and bottled chemicals that clung to the raw cement walls and had been gathering dust for the good part of a century.

A broad bench was constructed in two parts, one on each side of a twin, broad-bellied sink that had originally been meant for laundry. A furnace squatted stolidly in the midst of the apparatus.

Then he saw Leeds, half concealed by the furnace, crouching protectively over a deep zinc tank like a bathtub.

"When will they come to arrest me?" he moaned. "I'd hope to finish my experiment—I'm so close to the solution!"

Gilroy was touched. "They're not coming to arrest you," he said gently. "So far the cops don't know who did it."

"They don't?" Leeds brightened. "But *you* found out."

"The cops never know anything. Only—" He hesitated, then blurted his single fear: "There's the chance that Major Green might become panicky that his maniac's slipping out of his fingers. He might have the militia search the houses!"

The old man trembled with redoubled fear. "If they did that—"

"This's what they'd find," Gilroy said, looking into the clear bath that filled the high, sharply square tank. In his career he had seen disgusting sights, but the human skeleton at the bottom of the chemical bath, with shreds of muscle, wisps of fatty nerves and an embryonic tracery of veins and arteries adhering to the almost exposed bones, made his hobnailed heart shrink. It took an effort to realize that the tattered remains were not remains but beginnings. The naked skull bore only the revolting fundamentals of what would eventually become features. "They'd think you were dissolving a body in acid!"

Leeds stared at the corpse in fascinated horror. "It *does* look like a dissolving body, doesn't it?" he quavered. "But it won't when it's complete—"

"When'll that be?" Gilroy demanded hopefully.

"In about twenty-four hours." The old man looked up at Gilroy's abstracted

face. "Do you think that will be enough time?"

"God knows. I certainly don't."

The situation definitely held a concrete danger. Gilroy knew that high positions often twisted the morality of men who had them. Most men in Major Green's place would unscrupulously sacrifice a single life for the good will of eight million, and perhaps a national reputation. Major Green, in particular, had been conditioned to think very little of individuals. If the militia searched the house, Leeds was almost in the chair.

They climbed up to the front room. Abner still sat at the window; he seemed to be fascinated by the militiamen standing at ease on the four street corners within his vision.

"Huh—young whippersnappers!" he hissed at the boys standing guard. "If I had my leg back, I'd get past them fast enough, you betcha!"

Leeds' characteristic optimism had ebbed away, sapped by the knowledge of the chaos his lifework had caused. He sat huddled in a chair as far away from the window as the wall would permit, his terrified mind absolutely useless to Gilroy.

The tall reporter saw only one hope. He felt his analysis of Green had been correct, but—he did not have to convince the commissioner! He had only to convince the public. Green would be washed up as a public figure; on the other hand, Leeds would be saved from being railroaded to the electric chair, and the chief's expense account would be cleared by a scoop! For any single item, he would gladly sacrifice Major Green.

He gripped the professor's thin arm in a hand like a tree root. "I'll get you out of this," he promised.

"Can you really?" Leeds asked breathlessly. "You don't know how I—"

"Don't step out of the house until I come back. In a couple of minutes it'll

be curfew. Chances are I won't be back before morning—"

Leeds followed him to the door in a panic. "But please don't leave me, Mr. Gilroy! Please—"

"You'll be all right. Abner's here with you."

"Sure," Abner croaked from the front room. "You got nothin' to fret about with me here. But ain't it time for my mush and milk, perfessor?"

"I'll get it for you immediately," Leeds quavered; then Gilroy was out in the darkening street, wondering how he was going to get past the alert sentries, who had already turned to watch his long body glooming up uncertainly toward them.

ON THE OTHER side of the Concourse, out of the martial-law district, Gilroy crowded himself into an inadequate telephone booth and dialed the office. Getting past the sentries had been ridiculously easy; he had only had to show them his guild card and explain that he worked on the night shift, and they had let him pass.

The night editor answered, rather tiredly.

"Gilroy, chief. Listen carefully. I found the guy. That thing I showed you today wasn't real. It was synthetic. The others were, too. I've got to clear him. He's working on a whole one—you know what I mean. If it's found, he's cooked."

"What do you want me to do?"

Gilroy put his mouth against the transmitter and said in a low tone: "I can clear him and grab off a scoop. That'd fix up that special-requisition business for you. He's got an entire one that's about half done. Send me down a photog with plenty of film. We'll take pix of the thing developing, slap it on the front page, and Nappie can go fly a kite!"

"Nothing doing, Gilroy," the editor said decisively. "This'd fix my job more



than the special req. The board has big plans for Nappie. They're making eyes at Albany; after that it's only a step to the White House. Nope. This'd knife him. It'd mean my job for sure."

"Wouldn't it be worth it?"

"Look, Gilroy—I'm taking enough of a chance as it is, backing you. I can't go sticking my chin out at the board any more than that. Just be a good boy and figure out some other way of saving your pal. You can do it. I'll back you all you want. But get a beat if you can."

"O. K., chief," Gilroy said fatalistically. "I'll go home and grab some sleep. Leave me a blank signed req. I'll dope something out."

LONG BEFORE DAWN, Gilroy's mind came awake. He did not open his eyes, for, through his shut lids, he could see that the sun had not yet risen. He lay quietly, thinking. His blanket, which, of course, was too short when spread the usual way, covered him in a diamond shape, one end caught tightly beneath his feet and the other high on his bony neck. His knees were drawn up, soles pressed against the baseboard. Ever since attaining full growth, he had been forced to sleep that way; but his adaptive nature did not rebel against conforming to beds that were too small, telephones in booths that reached his solar plexus unless he shoehorned himself down, or bus seats that scraped his sensitive knees.

In some way, he was thinking, he had to stop the reign of terror in the Bronx; prevent suspicion from being focused on Professor Leeds; and, at the same time, cover the night editor's expense account—which meant getting a beat that would not smash Major Green's reputation.

But, to keep the police commissioner's record clean, he needed a victim. Gilroy knew enough about public pressure to realize that a sacrifice was absolutely vital. Left to himself, Green would find himself one—anybody it could be pinned on. The public would be satisfied, and

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the strutting martinet would again be a hero.

Gilroy's duty was plain: he would have to find a victim for Green.

At that point Gilroy's eyes almost snapped open. By sheer will power he kept them shut, and contented himself with grinning into the dark. What a cinch! he exulted. He'd get a victim, and a good one! All at one shot—end the terror, clear the professor, get a scoop and save the chief's job! Incidentally, he would also give Napoleon a lush boost, but that was only because it worked out that way.

Gilroy pulled his knees higher, kicking the blanket smooth without even thinking about it, and turned over to go back to sleep. There were a few trifling details, but they could be settled in the morning.

THE CITY EDITOR had scarcely glanced at the memos left on his desk when Gilroy strode in.

"Morning, boss," the reporter greeted cheerily. "Did the chief leave a requisition?"

"Yeah, a blank one, signed. Fill in the amount. I don't know—he must be going soft, leaving himself wide open like that."

Gilroy waved his hand confidently. "He's got nothing to worry about. Tonight we'll have an exclusive that'll burn up the other rags."

"But, first of all, do you know a good, reliable undertaker, and how much will be charge?"

"Oh, go to hell," the editor growled, puttering about among the papers on his desk. Then his mouth fell open. "An undertaker?"

Instead of answering, Gilroy had dialed a number. "Gilroy. . . . How's he coming along? . . . No, not Abner; the other one. . . . Good. . . . Is there any way of speeding it up? . . . Well, even a few hours'll help. I'll be up as soon as I fix everything down here. . . . Oh, you don't have to get panicky. Just stick in the house until I get there."

"Who was that?" the editor demanded. "And why the undertaker?"

"Never mind; I'll take care of it myself. I want your gun. I'll get a hammer and cold chisel off the super. Write a req for the gun—the paper'll take care of it. Let's see, anything else? Oh, yeah—"

Gravely, he took the gun from the astounded city editor. As he sat down at the typewriter and began tapping at the keys, he was completely aware of the city editor's stare. But he went on typing.

Within a few minutes he yanked the paper out of the machine and disappeared into the elevator. In the basement he borrowed the hammer and cold chisel from the apathetic superintendent. For nearly an hour he pounded, hidden away behind the vast heating system. When he put the gun into his back pocket, the serial numbers had been crudely chiseled off.

Then he took a taxi and made a tour of undertaking establishments. Curiously, he seemed less interested in prices, caskets and the luxuriousness of the hearses than he was in the condition of the owner's businesses and the character of the drivers.

He found the midtown funeral parlors too flourishing for his satisfaction. He drove to a Tenth Avenue frame-house establishment.

"Rotten," the owner grumbled in reply to Gilroy's question. "The city's taking over these here tenements. Nobody lives here, so how can they be kicking off? I'll have to get out soon, myself."

Gilroy approved of the driver, who had evidently seen plenty of shady funerals. He offered the owner a flat sum for a full day's rental of the hearse and chauffeur. He was extremely pleased to see the gloating light in the owner's sad eyes. There would be no questions asked and no answers given here, he thought shrewdly.

Finally he called the city editor and told him bluntly to have two photographers waiting for his call, ready to meet him anywhere in the city. He slammed down the receiver before the editor began cursing.

It was merely another experience in a reporter's life to be driving uptown in a hearse. At 125th Street he suddenly remembered something very important. He had the driver stop, walked two blocks toward the Third Avenue el. When he returned twenty minutes later, he carried a bundle, which he threw into the long wicker basket inside the hearse.

HE HAD NOT anticipated any difficulty in passing the militiamen. He knew that mailmen, street cleaners, telegraph boys, doctors, and hearses would be able to move around freely within the martial-law area.

They rode, unchallenged, directly to Professor Leeds' door. There he and the driver slid the basket out and carried it into the house. The sentries were scarcely aware of their actions.

"I'm so happy to see you again, Mr. Gilroy!" the professor cried. Then he gaped at the basket. "What's your plan?" he asked anxiously.

From the front room came Abner's querulous voice: "They ain't here for me, are they, pefessor?"

"No, Abner," Gilroy called out assuringly. "Stay here, driver."

He led the professor down to the basement laboratory. Gilroy nodded in a satisfied way at the body in the tank.

"Another two hours and it will be finished," Leeds said.

The epidermis was almost completely formed. Only in isolated spots could the glaring red muscle be seen where the skin had not quite joined. Its fingers and toes had no nails; and, excepting the lack of hair, eyebrows and lashes, its features were distinctly human and complete.

"I'm just waiting for the hair to

grow. That's the final stage. The skin will be whole in a few minutes. Then the nails—"

Gilroy heard wheels rumbling over the ceiling. The cellar door flung open and Abner shouted down, in terror: "Perfessor! Hey—they durn sojers're goin' through all the houses on this here street!"

Gilroy leaped up the stairs and dashed through the hall to the front windows. At each end of the block he saw eight soldiers; four stood in the gutter, facing opposite sides of the street with leveled guns. The other four paired off and entered houses with fixed bayonets.

"They can't do that 'thout a warrant," Abner protested.

"Can't they?" Gilroy snorted. "They can, and they're doing it. Sit here by the window, Abner, and warn us when they're getting close. They still have half a block to go before they reach us. Come on, prof—"

He removed the bundle from the long wicker basket and raced down to the cellar. While he ripped off the paper, he ordered the professor to take the body out of the chemical bath and dry it.

Leeds cried out: "He isn't complete yet!" But he removed the body, in spite of his complaints, dragged it to the floor and dried it. "It isn't alive!" he suddenly wailed, his hand shaking against its chest. "It should be—it's perfect!"

GILROY shook out an entire outfit of clothing, a pair of old shoes and a filthy hat that closely resembled his own. "If he isn't alive, all the better," he said. "Anyhow, I always thought it was too much to expect him to live. Take fish, for instance. Put them in the same kind of water they always lived in—temperature just right, plenty of oxygen, plenty of food—and what do they do? They die. You make a body that's identical to a living one, all the necessary organs, all the chemical in-

gredients for life—and it just doesn't live. Otherwise it's perfect.

"Here, lift up his legs so I can slip these pants on him.

"You're on the wrong track, prof, when it comes to making synthetic human beings. You can give them everything but the life force. But there is one thing you can do. You can grow limbs on people who don't have 'em. Give Abner a leg. His life force can vitalize the synthetic leg."

They pulled a shirt on the body and tucked it inside the trousers. Gilroy spent a mad few minutes trying to knot a tie in reverse, until he knelt and tied it from behind. While he forced its arms into a vest and jacket, Leeds squeezed its flabby, yielding feet into shoes.

Then Abner croaked: "They're only two houses away, perfessor!"

Leeds grew too jittery to tie the laces. Gilroy did it, crammed the battered hat into the body's coat pocket, and roared for the hearse driver to bring down the basket. It was the work of a moment to load the corpse into it and strap on the cover. Almost at a run, he and the driver carried it up the cellar stairs to the front door. They dropped it while Gilroy made a hurried telephone call:

"Boss? Gilroy. Send the two photos to 138th and Triboro Bridge. Right before the entrance. I'll pick them up in a hearse. Be there with the chief if you can get him to wake up."

He paused a moment to pat Abner on the back encouragingly. He said: "You're all clear, prof. Look in the *Morning Post* tonight. Drain the tank. If they ask about it, say you used to bathe a dog in it. So long!"

They carried the wicker basket to the hearse at a slow, fitting pace, just as the militiamen were leaving the next house. At the same funereal rate of speed they cruised through the martial-law area, which was being thoroughly searched, until they came to the Grand Concourse.

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"Open it up!" Gilroy rapped out suddenly.

They streaked through traffic, turned east. At the bridge they had to wait fifteen minutes before the photographers arrived in taxis.

Gilroy dismissed the cabs, paid off his hearse driver, and ordered the photographers to help him with the basket. A scant three minutes later another taxi drew up at the hearse and the city and night editors scrambled out excitedly. They sent their cabs away.

"What the hell is this?" the city editor demanded. "Robbing graves?"

"Just give us a hand and keep quiet," Gilroy said calmly.

They carted the heavy basket to a deserted dumping ground behind two vacant furniture warehouses that had been condemned by the city for the new bridge approach. He removed the basket cover and ordered the photographers to help him take the body out and hold it erect.

"Now watch this," he grinned.

While the editors and photographers watched in horrified amazement, Gilroy backed off ten feet and fired the gun at the corpse's heart. He quietly wiped his fingerprints off the butt, removed the body from the photographers' inert hands, and laid it gently on its back, crooking its right hand around the gun. He placed the cap on the ground beside the naked, hairless head. Then he crumpled a sheet of paper in his hand

and just as deliberately smoothed it.

"Snap the body from a few angles. Wind up with a shot of this note."

The two editors snatched at the note in a single wild grab. They read it swiftly.

"Holy smoke!" the night editor shouted. "I am the torso murderer. I realize that I have been insane for some time, and, during my lapse from sanity, I kidnaped and hacked to death a number of people. But the cordon of soldiers hounded me from one place to another, until I am finally driven to suicide in order to prevent my being captured. My name I shall take to the grave with me, that my former friends be spared the horror of knowing that once they loved this murderous maniac. God save my soul!"

The four men grinned admiringly at Gilroy. But the towering reporter dismissed their admiration with a modest wave of his astoundingly long, incredibly bony arm.

"The only thing I regret is that this's a gorgeous build-up for Major Green—the lousy nipplehead!" he said mournfully. "The autopsy'll show a thousand proofs that this thing never lived, but a fat lot Nappie'll care. And to think that I'll probably be the cause of making him governor!"

He insisted on holding the creased suicide note for the photographers to aim at, claiming that it required a certain artistic touch.

### IN TIMES TO COME

The April Astounding brings the fourth and best of the astronomical covers: Saturn as seen from Japetus. It's been done by Schneeman, and has received high praise from outside art critics purely as a piece of art. It's right astronomically, done with the co-operation of some of the lecturers at the Hayden Planetarium.

And it illustrates Nat Schachner's short novelette, "World's Don't Care." There's another unusual novelette coming up—by A. M. Phillips—"Revolt!" Eando Binder's back with a yarn called "Rope Trick" which seems to prove that a good rope artist can always make a living—even a century hence.

Malcolm Jameson has one of the unusually-screwy class stories that turns up now and then. It's really a lovely idea—and darned near rates a mutant classification! It's called "Catalyst Poison," which gives you, really, no idea. Hiccup might be better.

And—watch for "One Against The Legion," Jack Williamson's new and genuinely excellent sequel to "The Cometeers." Giles Habibula will be back—with a more concrete reference to that mysterious past of his, in this long, three-part serial.

The Editor.



# BEYOND THE SUN



BY D. L. JAMES

## BEYOND THE SUN

*A man-eating plant—of a very new, and very helpful variety!*

ALAN NORTH sank back against the curved metal body support behind the controls of Relief Ship Z-2. He groaned. "How long," he asked his crew of one, "are you going to keep fussing with that thing? Here we dodge clear across the most important part of the Solar System, chasing that runaway freighter out there, and when we get close enough to tie to it we might as well use a pack thread as that so-called tractor beam. How much longer, Carl?"

Carl Manners didn't look up. But North could see that his skillful hands were busy. He was just putting the finishing strokes to a touchy bit of repair wiring. North couldn't help because there was room for only one pair of hands. That was what galled worst.

"Chief"—Carl Manners' voice was expressionless—"who's supposed to be responsible for the operation of this lousy space wart?"

"I am, Carl," admitted North, groaning again. "I tried to wangle a new outfit for us. Ordinarily, when time isn't a factor, the old Z-2 takes care of things pretty well. But this is different. If we don't manage to swerve that freighter, she's going to crash—"

"There's something mighty strange," Manners spoke grimly. "Why did their radio beam go dead? All we know is that they reported a ruptured fuel tank, yelled for help, and then—blotto! As it happens, there's not a relief ship near them, so we leave our regular patrol just inside the planetoids, and scorch space getting here. By the time we locate this freighter, she has drifted in close to the Sun—not too close—and then past. But she's drifting in a geo-

desic that looks damned queer— Hey, chief, I've got to blink the ESP shield for a second while I splice this cable."

"O. K.," said North, throwing a quick glance at the gauges. He knew what to expect. In the raw vacuum between the planets, extra-sensory perception was something to be reckoned with, inducing a kind of acute neurasthenia. For a moment—a devilishly long moment—he watched Manners work as if under some invisible pressure. Then the tension snapped off and things were normal again.

MANNERS straightened, beads of sweat showing on his otherwise nonchalant, lean face. "She's on," he reported needlessly. "Al, we got to hand it to those old-timers who used to go rocketing without the shield. All set."

Alan North swung around swiftly to the controls. Manners staggered on wide-braced legs as the Z-2 lurched under them.

"Lord," he breathed gently. "How's that for a tractor beam? Guess we got a line on her now. We're flopping around like a hooked whale."

"Yeah—a whale on a ten-thousand-mile rubber band." North swore softly, eased fuel into the forejets. "It's stretchy—too stretchy. No need to decelerate. We'll have to get in closer, and there isn't time. Here, take over, Carl—"

Relieved at the controls, North stationed himself at a forward port. Ahead, magnified by a series of thick lenses, the black abyss of space seemed to be pressed close by unwinking stars. He could see the freighter. Ablaze with sunlight, it appeared deceptively near, headed for

that tawny orb whose clean-cut limb was creeping steadily into the field of vision.

"Osarida, the ghost planet," he muttered. "Twin of Earth, yet never seen from the Earth because Osarida is always hiding behind the Sun. Did you ever ground there, Carl?"

"Never," declared Manners. "I don't think it's been colonized, or even thoroughly explored. It's a blasted unhandy place to reach from Earth—and it's small."

"Well, it's plenty big enough to stop that freighter. Say! Grab a look. Either the ESP has got me loony, or—No, by Neptune! We're close enough now to see their forejets working! They're decelerating—"

"I knew it," growled Manners. "Something's rotten aboard that flying boiler. I've calculated many an orbit, and that ship never drifted out here to Osarida under the influence of gravitation alone."

North whistled through his teeth and gave Manners a long look. "Shut off that beam, Carl. They don't need it. They're going to ground, but not nearly so hard as I'd like 'em to. Here we've burned up space and worked ourselves ragged— Oh, well, as you say, there's something queer going on. We'll drop down there and find out what."

That tawny planet widened out under them as he watched. Soon the Z-2 was so close that the freighter could be discerned as a tiny speck through the plane-glass ports.

"They're maneuvering to land in the dawn section," Manners pointed out. "See where the shadow is all fringed and notched? You say that freighter is loaded with mining machinery?"

"Yes—for the Earth colony on Mars. Skipped by Jim Tallant, a square shooter."

"Hm-m-m. Well, it looks like someone has snatched a shipload of mining tools. But why bring them out here? Never heard of any valuable minerals on Osarida."

"No," agreed North. "Osarida is

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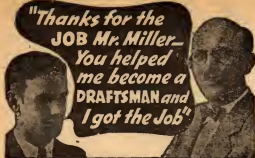
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just a miniature Earth, three thousand miles through—same minerals, same atmosphere, same distance from the Sun. But there's no water here, at least not on the surface; it's dry, parched. However, I've heard that there are still traces of moisture at the bottom of rocky fissures, a mile or so beneath the surface, even springs and shallow pools. Osarida is not commercially important. The queerest thing about this little planet is its orbit, which is eternally synchronized with Earth's. One of those stable, three-body hookups puzzled out by the mathematician, La Grange, centuries before the planet was ever discovered. Osarida, Sun, Earth, all in a straight line—"

"Hey, Al, they've grounded," said Manners suddenly.

For a time North peered down through the not-too-transparent glass beneath his feet. A surface of rusty red and gray ridges and ochre hollows was stretching out below the Z-2. A slight atmospheric haze began to soften the vivid rawness of empty space. The freighter, a tiny dark lump, lay in one of those gray-ribbed grooves—a narrow valley. Pin points of light began to prick out suddenly alongside the grounded ship.

"Fighting!" North raised his head to stare at Manners. "Say, things are picking up, Carl. Drop us down there—but not too close. Quick, before they see us!"

North had no plan in mind. He and Manners were mere mechanics of the spaceways; the Z-2 was not a fighting ship; rather, it was like a flying machine shop outfitted to offer relief to ships suffering damage or breakdown while in passage. However, curiosity now gripped him; he wanted to know what was going on.

The Z-2 dropped like a plummet and grounded on the far side of a concealing ridge of gray rock, some two miles from where the freighter lay. Manners, eager to set foot on solid ground, passed quickly out through the air lock; but Alan North conscientiously set about

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putting everything to rights for a quick take-off. Ten minutes later he joined Manners.

HE CAME upon a queer scene. Manners was leaning against the battered hull of the Z-2, smoking a cigarette, while near him huddled a group of as strange-appearing creatures as North had ever met up with.

There were five of the creatures, grotesquely human-shaped, but considerably less than human size. Each had two legs, two arms, and a head. Their bodies were covered with a silvery-gray web, which seemed to be a natural growth of the skin, and their heads were merely blank ovoids set with two round eyes. There were, strangely, no other features, no mouths.

"Where'd they come from?" asked North. "What do they want?"

"I'm no mind reader," protested Manners. "They came out of the woods there. I take it that they're native Osaridans, but I wouldn't know. They want something. They crawled up like scared dogs, and they keep pointing over that ridge."

Meanwhile, North had been looking around. He saw the "woods," a patch of green, cactoid growths—thick-stalked, stubby plants, which lay at the end of what appeared to be a deep crack splitting the rock ridge beyond which lay the freighter. And those tree-sized growths looked oddly out of place in this arid terrain.

Manners was sniffing the sweet, dry air appreciatively. "Say, this isn't half bad! Some change after that synthetic potpourri of helium and oxygen we've been breathing, eh, chief? Not a bad little world, at that. Good solid ground, good sunshine—"

North was inspecting that little group of out-world creatures, and they, in turn, were watching him intelligently with their dusky, round eyes. Their bodies, he saw, were incredibly thin, but not

emaciated, as if certain internal organs—a digestive tract—were lacking.

"I can't understand how they eat," observed Manners. "No mouths. I wouldn't want to hurt their feelings, but these guys look like they haven't any guts."

"Look here, Carl," said North suddenly, pointing. "If those purple welts aren't the marks of a whiplash—"

"Right," agreed Manners. "All over the poor guy's back."

The creature under discussion edged forward and pointed with its queer pad-like hand toward the ridge. The others were also motioning. North stared, but could see nothing unusual.

"These gents know something," he decided; "something they want to tell us. What surprises me is that there are any living creatures here at all. Feel that air? It's hot, dry; this world is practically dehydrated. The last trace of surface moisture must have dissipated ages ago."

"If my ESP was working better," remarked Manners, "I might be able to understand them."

"Extra-sensory perception?" mused North. "Blast you, Carl! That gives me an idea. Wait right here."

He reentered the ship. In the tool room were several lockers stored with a conglomeration of odds and ends. Pawing here for a time, he presently unearthed a cumbersome-looking metal helmet, and with this and a small screwdriver he rejoined Manners.

"Well, I'm blowed!" exclaimed Manners. "Where'd you find that relic?" He had lit another cigarette and was evidently enjoying himself. He grinned as North sat down with his back against the battered hull of the ship.

"My friend," said North, clamping the helmet between his knees so that he could remove four small screws in its crown, "these old ESP helmets were mighty popular at one time, before they commenced shielding the whole ship."

Manners nodded. "And before they got those helmets, they used to try rock-eting in space without any protection at all—which drove them loony. But what's the idea in fiddling with it now?"

NORTH GRINNED at the little group of Osaridan creatures, who had now drawn close, their blank, silvery-gray faces turned toward him, their soft eyes watching intently—intelligently.

"I'm going to find out what these animated bean poles want," he told Manners, prying a small plate loose from the top of the helmet. "Take a look into this brain pan and I'll put you wise to a trick they don't generally teach in kindergarten."

Removal of the plate had disclosed a small translucent cone, which appeared to be made of stiff gelatin, inclosing a diminutive wire helix. There was also a glass bulb in which a moatlke point of soft green light pulsed and fluttered.

This helmet was one of those representing the first successful attempt to combat that field of vital energy, akin to thought, which filled all space as a result of life forces throughout the cosmos acting and interacting in a manner somewhat analogous to that of gravitation. Indeed, certain scientists held the phenomenon of life itself to be due to this influence upon inanimate matter, for, like ultra-violet emanations, it was tempered and altered by an atmospheric envelope—or by the artificial combative field produced by the helmet.

North probed delicately with the screwdriver, for Manners' edification, among the massed connections. "See these two wires? They're now connected in series with the helix. We'll shunt them across, like this—"

"What'll that do?"

"Reverse the field effect. This helmet is now no longer anti-ESP. Every living creature throws a thought field. But normally, surrounded by deadening gases, we don't sense these fields. This

helmet, switched over as it is now, will make me abnormally sensitive."

"Humph," grunted Manners. "I thought maybe you were going to use it as a crown and set yourself up as king over these owl-eyed guys. Put it on, chief. Let's see you and them get intimate."

North rose to his feet. "By making my mind receptive," he explained, "I should now be able to get the viewpoint of anything that thinks, and by concentrating I ought to get my own ideas across."

He eased his head into the helmet.

Instantly he noticed a change—as if some misty veil covering the face of nature had been snatched aside. Things were more vivid—vivid in a queer way that had nothing to do with the five senses. Eyes and ears told of the rough Osaridan landscape lying there around him just as before, yet there was a difference, a realization of things unseen, unheard—

"O. K.," he said, addressing those queer creatures. "What can we do for you?"

One of them—the one North had mentally singled out because it seemed to possess a mild degree of dignity—ducked its head. Mental impressions, clear ideas—or rather a kind of ideamagery—radiated from the creature. A moment passed—

"That's odd," remarked North. "Those creatures lack any vocal organs, and think without a language, but I'm catching the drift of what it's about—"

AND HE WAS! Water—that was the cry radiating from this denizen of a world long dying of thirst. North seemed to see a narrow trail leading down through a rock-bound fissure to a shallow pool that lay in utter darkness.

Osaridan creatures pattered in constant procession along this time-worn trail; but the ones going down were thin and shriveled; the ones coming up



were gorged and plump, as if they had soaked up moisture through the very pores of their skin.

Then a new element appeared on the scene. Lights flashed; there was the pound of machinery, crumbling rocks, vague forms in the shadows—men! Osaridan creatures racing up that dark trail—still thin.

Presently North removed the helmet.

"Someone has interfered with the water supply of these creatures," he told Manners. "For ages they have procured water from far underground, in that fissure that cuts through the ridge; but now men have drilled down to occupy a cavern near their pool and drive them away. When they sneak down after water they get lashed with a whip—or worse. They are appealing to us. They want us to intercede for them, and in return they offer to help us."

"So that's it! They must be good at reading minds to know we belong to a different gang," said Manners. "But look here, Al, if water is so scarce, how does that patch of woods manage to grow?"

"Perhaps they irrigate—carry water," mused North. "They must get food from somewhere, although without mouths—"

"Good Lord!" ejaculated Manners. "Look who's coming over the ridge."

A figure had appeared on that rocky elevation hiding the freighter; a human figure. It came staggering and weaving down toward the Z-2.

North's eyes narrowed. "Jim Tallant," he reported presently. "Captain of that freighter, and as fine a scout as ever skippered a ship. I've known him from way back."

"He looks winded," said Manners.

North advanced to meet the staggering man.

"Jim Tallant!" he called. "What's wrong?"

The figure halted, stood panting. A bearded face swiveled around; blood-

shot eyes beheld North, apparently for the first time.

"Alan North! Is it you? Mutiny!"

"Mutiny? I figured something like that, Jim."

"Yeah—caused by a gang of stow-aways! Traitorous officer gave me a false report, so I sent out that S O S. You must have got it. Then they smashed the signal apparatus. We barricaded ourselves in the control room. They gassed us out in time to land here on Osarida—but here's where they wanted to come, anyway. We managed to fight our way off the ship. They rayed us! All dead now but me."

After a hurried glance along the ridge, North grasped Tallant's arm and urged him toward the ship. Manners was waiting there alone, North saw, for apparently the Osaridan creatures had re-entered that patch of odd-looking vegetation.

THE REFUGEE was regaining his breath somewhat. "I dodged 'em," he explained. "It's rocky as hell over there. I circled. I don't think they know where to look."

"But why did they want to come out here?" asked North.

"That damned space pirate, Corbb Brolt! He's here—on Osarida. This is his secret hangout. His whole outfit is over there on the other side of the ridge. They're building an underground retreat for his ships—a place they can dodge into when things get too hot—and he needed tools, mining tools. It's a regular munition dump over there, with enough furaminite bombs to blow up every important city on Earth!"

"Furaminite?" Manners' lips formed a hard line. "Wonder where he got 'em? They've been tabooed by every race intelligent enough to manufacture them."

"He's making them!" bawled Tallant, wiping sweat from his brow. "They've struck a vein of cobalt—furaminite, you

know, is a salt of cobalt, the most hellish explosive ever devised!"

"Say—if we could get one of those bombs," proposed Manners, "or touch one off some way— But how? Furaninite explodes only by concussion."

"The Z-2 is a relief ship, not a fighting ship," North pointed out. "We save life. But right now I wish we had a fighting ship. We haven't, so our next move is to turn in this information."

"Get some fighting ships here," said Jim Tallant, leaning wearily against the Z-2's hull. "You'll be saving life that way. Corbb Brolt's gang isn't human! Our best bet is to send out a radio beam to Earth—"

"Can't do that from Osarida," objected Manners. "We'd have to blast out at right angles for about half a million miles to throw the Sun out of line. But what about those rookies on the other side of the ridge? Isn't it about time they came snooping around?"

"The way I dope it out," explained North, "is that they never got wise to us at all. But they may try to trail Jim, although they probably aren't worrying about him."

"They don't know you're here," agreed the fugitive. "They were too busy burning down my men to notice when you grounded."

"Blast it, man!" protested Manners. "You mean they didn't feel our tractor beam?"

North grinned. "Carl, that beam barely gave us a good yank, and that freighter outweighs the Z-2 a hundred to one. No, they wouldn't have felt it."

Manners looked hurt. "They never were close enough," he muttered. "What'd you expect at ten thousand miles?"

"The beam was O. K.," North assured him. "But now to get down to the real problem—if we blast away from here, they can't help but see or hear us. We might get away clean. But whether we did or not, we'd give our hand away.

Brolt would know that his hangout was discovered, and before we could call in a flock of fighting ships, he'd be gone."

"So what?" asked Manners.

"Well, just this," declared North, thankful for a sudden idea: "Before blasting loose, we'll move the ship farther away—that is, we will if that tractor beam is any good. See those rust-red crags over there beyond this strip of fairly smooth sand on which we're lying? There's probably iron in those rocks. This pet beam of yours is a bipolar magnetic beam—really a twin beam—held from spreading or uniting by a succession of vortex rings projected along its length, like beads on a thread. It ought to anchor solidly enough in those rocks to haul the Z-2 over this sand without using your blast tubes. Can you do it?"

"Watch," advised Manners briskly, turning to enter the ship.

"While you're about it, I'm going to trek up to the top of that ridge and look over," added North. "And, by the way, you better pick a place for that beam where there's no loose rocks. Shut off after ten seconds to allow any dislodged particles to drop out of the beam."

Manners nodded, entered the ship.

NORTH HEARD the low whine of starting generators. Suddenly, like an enormous snail, the Z-2 started dragging itself along over the ground. Then it paused. After a short interval of rest, it again lurched ahead, moving silently save for the grating of sand beneath its pitted and scarred hull.

North smiled with relief. "Jim," he said to Captain Tallant, "you better tag along with the ship. I'll meet you and Carl by the time you get to the other end of this smooth strip of sand. You'll make it O. K., but it'll take time."

With the obsolete helmet swinging in one hand, North strode away, following his long shadow cast by the rising Sun. He wanted to look over the ridge at Brolt's hangout; but also, and more par-

ticularly, he wanted a chance to look at that lone patch of strange cactoid growths which seemed to be the home of those odd creatures, the Osaridans. Here was a last remnant of life still existing on a world dying of thirst. Brolt's mining activities had interfered with the meager supply of moisture, that much was now clear to Alan North. But other details were not so clear, and he meant to satisfy his curiosity.

North was armed only with the usual belt weapon—a pistol whose released bolt of vibrations was capable of boiling barytrons off the nuclei of atoms. It was effective only at short range, however. Walking with long strides, he quickly drew near the end of that narrow fissure which cut down and through the ridge. His surroundings were faintly and pleasantly reminiscent of Earth, but there was a difference—a dry, alien tang in the air, and a certain sense of ethereal openness, as if the sky covered too large an area.

He came upon a worn pathway descending into the dim depths of the fissure. But he had no time to explore down there. Near him now were those utterly strange vegetable growths—not more than twoscore of them—crowded in a dense grove around the end of the fissure.

He saw nothing of the Osaridan creatures; no huts, no sign of artificiality except that path leading from the narrow fissure up among those huge plants.

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North had ever seen. Giant, squat growths, with lushly fleshed leaves and stalks. Radiating from each sturdy bole were a dozen or more cobralike tendrils that seemed to reach out thirstily. They curved up, then down, so that the huge bud dangling at the end of each just cleared the ground.

Buds? Yes, they looked like buds to North—at first! Then, as he drew closer, he saw that below broad, backward-curving sepals hung a bud-shaped mass of semitransparent jelly, a four-foot globoid of what might be living protoplasm.

The sound of small feet pattering on the age-worn pathway drew North's attention away from this awe-inspiring sight.

He turned, saw one of those queer Osaridan creatures emerging from the fissure. But this one was not thin, as were those who had visited the ship; it looked plump and puffed up, as if it had soaked up much water. Evidently it had just completed a successful sneak down to that underground pool.

Its round eyes regarded North curiously, but audaciously, as it pattered on past him and, approaching one of those Gargantuan plants, walked unhesitatingly into a hanging bud. That jelly-like substance seemed to open up and infold the creature, and it was—gone!

NORTH swore softly. Now, here and there around him in the semitransparent globoids of other buds, he could vaguely discern the bodies of the Osaridan creatures. Some of the globoids were small, as if as yet not fully formed, and in these, in still vaguer outline, were what appeared to be embryo Osaridans.

And while North stood there staring, one of the larger globoids shook, quivered, disgorged a fully grown Osaridan creature—thin, like those others.

For a moment the creature's soft round eyes regarded North, then it pattered off down the path into the fissure.

What did this mean? Evidently

these creatures were water carriers for the plants. The plants, then, must synthesize food from the supplied moisture, sunlight, inorganic matter. Neither could exist without the other. These creatures evidently soaked up water through their skins. Were they nourished in a similar fashion, within those globoids, by a kind of osmosis?

North left the grove and started climbing the ridge. He must waste no more time. Apparently what he had observed was a kind of symbiosis—two dissimilar organisms joining and living together for their mutual benefit here on this dying world—and yet, that didn't seem just the answer. For in this case the Osaridan creatures seemed actually to be a product of those monster plants. As if the plants, faced with extinction, had managed to evolve mobile water carriers—free organs!

Nearing the crest of the ridge, North paused to look back toward the Z-2. Blunt-nosed, battered and unbeautiful, it lay motionless, as if bogged down in the sand, only a little way out on that smooth expanse.

Not so good. Frowning, North climbed up until he could look over into the next valley. The big freighter lay somewhat nearer than he had thought. In that clear, dry air he could see several figures moving near it, and around five smaller ships—sleek, wasp-hulled ships that threw back the morning sunlight with the blue gleam of polished steel.

That fissure, like a narrow, black crack, extended completely across the valley. But one side was raised higher than the other, and in the face of this cliff a black opening stared out like an evil eye presiding over the scene. That must be the portal to the underground hide-out Brolt was constructing, North thought.

For several moments he crouched there behind a rock, watching.

"Hm-m-m," he muttered finally.

"Wonder where Jim saw those furaminite bombs? Chances are that they're stored outside somewhere. On this cloudless, rainless world nothing needs to be sheltered."

A wild thought occurred to him: What would a tractor beam played around in Brolt's camp do to those bombs? Like iron, cobalt—the base of furaminite—was ferromagnetic. Then wouldn't a magnetic beam pick them up, or at least jolt—

THIS IDEA suffered a rude interruption. Without any warning whatever, that rock behind which he was crouching developed a foot-wide disk of stunning, blinding brilliance.

North whirled. Men, a score or more, had swarmed unnoticed over the ridge at a different point, and already the Z-2's old hull was breaking out with a fever rash of hot sparks caused by bolts from their long-range disintegrator rifles.

"Corbb Brolt's men!" gasped North. "Now wouldn't that kink your orbit?"

Here and there around him the rocks were gleaming, cracking, dissolving. He scowled, swore, and on all fours crawled for concealment.

Finding momentary security behind a jagged splinter of rock, he crouched down. He still had that old ESP helmet. He slammed it on his head and, with tremendous, frantic concentration, tried to hurl a mental warning and order to Carl Manners—

A moment passed. Then he heard a sound for which he had been praying—the roar of the Z-2's take-off jets. Three seconds later, over the top of the rock, he saw the battered old ship streaking spaceward.

"Carl and Jim got away," he husked, gratification easing his tight lips. "Wonder if Carl understood what I tried to tell him."

Deciding, however, that this was no proper time nor place to bemoan his

own forsaken state, he snatched off the helmet and commenced a scuttling retreat.

This broken, stony tract which had saved him from immediate extinction ran in a kind of talus down the slope, where, at the bottom, it flanked that grove of Gargantuan plants.

Meanwhile, Brolt's men were stalking up on him. Turning a corner of rock, he was suddenly confronted by two of them not ten yards distant.

North's hand snapped to his belt. There was a dry cough from his barytron pistol, and he saw the legs go out from under one of those stalkers.

Sheer luck! It was all a question of who saw whom first.

Presently he found a place where, without exposing himself too much, he could stand upright. Those skulkers had circled down and around him. Acting on a sudden idea, North again donned the helmet—

Like the opening of a door, that silent, lurking menace flooded into his consciousness. Fields of hate, vengeful, murderous, were creeping around him in a closing cordon. But there were still gaps, here and there, and North chuckled harshly, for now the exact position of each and every one of those unseen stalkers was revealed to him.

Creeping from rock to rock, with sudden extinction the price of a single false move, Alan North's game was one of tense maneuvering. But despite the most careful strategy, he was now and then glimpsed by a lynx-eyed searcher, and at such times life hung by a slender thread. At other times judicious use of his "bary" gun kept that circle of death from narrowing down.

It was a slow, deadly game. The Sun glided up quickly in the Osaridan sky. What was Carl Manners doing out there in space? Was he trying to call in fighting ships? If so, they would arrive too late, either to catch Corbb Brolt's gang or to help North. Or was

Carl following out that last mental order?

As North drew near the end of the fissure—and near that grove of monster plants—a soundless murmur arose in his consciousness. It was caused, he thought, by the composite field effect cast by those living, growing things. And it seemed almost as though they, too, were watching this deadly game—watching and cheering him on.

North had almost reached that pathway leading into the fissure when the inevitable overtook him. Hissing shafts from long-range disintegrator rifles in the hands of Brolt's snipers had been striking futilely, blindly around him. The end came not as a direct hit, but merely the backwash of splashing coruscating particles from one of those dissolving rocks.

Searing, numbing agony suddenly engulfed Alan North. Dimly he sensed that he was trying to beat with blackened hands at the few shreds of smoldering fabric that still clung to his blackened body. But his neural system was paralyzed; he could not move. Then even this vague consciousness evolved into a land of nightmare.

IT WAS a queer nightmare. Soft, padlike hands seemed to be grasping him, bearing him swiftly along a tide of torture through some unearthly forest of thick-stalked, green-fleshed plants.

There came an interval of fainting vagueness during which he seemed to be swallowed up and engulfed by something cool and soothing, and abruptly the agony left him. He knew this must be death, for his body was burned far beyond its ability to repair—

But the nightmare continued, although now it seemed more like a weird and preposterous dream, in which his own identity was merged and lost within some alien stream of genealogic consciousness.



He was thinking no human thoughts, nor the thoughts of any one entity; rather it was a kind of ancestral or species awareness.

Water!—that was the thing he was always seeking. Moisture, which lay always beyond his reach—beyond the longest blindly groping arms.

And such arms! Arms that were somehow plant tendrils. Hundreds of feet long, they groped into rock crevices and fissures—groped, for they had mastered the art of muscular wriggling in their eternal search for that life-giving moisture—but their groping was not entirely blind, for each had evolved two eyes on its snakelike extremity.

Still the water lay always beyond reach, retreating farther and farther into narrow fissures, sinking deeper with each passing age. And no plant could migrate bodily down into the caverns where the moisture lay. They had to stay out in the sunshine. Not even the fungi could inhabit that darkness without a constant supply of organic compounds. So the plants sent down thirsty tendrils.

But those tendrils were suffering constant ravage. They were broken off, trodden upon, devoured by the hungry beast things which congregated around those ever-diminishing pools.

However, some of those broken ends did not die at once. Occasionally one would wriggle on, would find water, and would even return, gorged with precious moisture—for they possessed, besides eyes, a rudimentary brain, intelligence.

And some of the more intelligent were mastering the art of engrafting themselves back on the tendril from which they had been broken. The globule of protoplasm oozing from the severed tendril made this easy. Moreover, once having discovered the advantages of free movement, they were not long learning how to again detach themselves.

More and more they were becoming animallike. But they were not complete creatures. Like zoöids, they lacked a

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digestive tract. They must depend on the parent plant for nutriment and cellular repair. And hence they sought only one thing—water.

Now they were no longer wriggling like snakes, but were walking upright on legs, and their brains were becoming larger. They formed a regiment of mobile water carriers for the plants—free organs.

But although each had evolved a separate sentience and the ability to detach itself at will, the psychosensorial connection was preserved unbroken and each water seeker remained in constant mental communication with the parent plant, and with its free brothers.

TO ALAN NORTH that dream seemed to continue on and on, through an eternity. He had ceased to worry about Corbb Brolt, or about Carl Manners and the Z-2, or about anything in regard to himself. He was not even aware that the ESP helmet was still on his head. He was part of a plant, a Gargantuan plant, thinking the thoughts of a plant, and wanting, above all things, to go somewhere and soak up moisture.

This obsession became so great that he kicked and struggled to free himself. Suddenly he seemed to fall through a slight distance, and to land upon a soft, sandy surface.

Like one awakening from age-long slumbers, he opened his eyes upon a world of almost equal weirdness—

He was lying on the ground in the center of that bizarre grove of Gargantuan plants. Over him, at the end of a lusty tendril, dangled a four-foot globoid of jellylike protoplasm, from which, apparently, he had just been disgorged.

Memory returning with a rush, he clambered to his feet.

In the greenish light that lay all around him he saw the round-eyed, silvery-gray faces of Osaridan creatures watching him; and, becoming aware of the ESP helmet, he snatched it off, stared down at his naked body.

The flesh was no longer seared and blackened! Some marvelous restoration

had taken place. He recalled the dazed agony that was his last remembrance, the feel of padlike hands snatching him away to safety after his encounter with Corbb Brolt's gang.

One thing was clear—he owed his life to these plant creatures!

Evidently they had stuffed him into the maw of that protoplasmic globoid, not just to hide him from Brolt's vengeance, but so that he might profit by their own system of nutrition and cellular repair.

One of those owl-eyed creatures stepped forward, bearing in its padlike hands a few remnants of scorched clothing, a belt, holster, bary gun—all North's possessions.

The fragments of his uniform were, of course, useless, but he was thankful for the gun.

Buckling the holster around his waist, North crept cautiously out to the border of that fantastic grove.

Emerging therefrom, into the broad sunlight, he paused, bewildered, astonished. That ridge of solid rock which had concealed Corbb Brolt's encampment had almost entirely disappeared! The rim of a monstrous crater now cut across where the ridge had been, a crater whose far boundary seemed many miles away—

Then he saw, not a hundred yards distant, the old Z-2 reposing peacefully on a patch of smooth sand. Carl Manners was running toward him with ridiculously long and excited strides, and North began suddenly to realize that a lot of things must have occurred of which he knew nothing.

Manners was shouting: "Chief! Where in Hades have you been?"

A moment later he was gripping Carl's hand.

"Carl, you old space buster," said North. "Rustle me some fresh toggery—I've been through blazes! What day is this? Where's Jim?"

"Out looking for you. Here he comes now. We figured you were dead. . . . What day? Gosh, Al—if you mean Osaridan days, it's the day after you and I grounded here—"

LATER, aboard the ship, Carl Manners grinned modestly.

"Exploding that furaminite," he explained, "was a dead-easy stunt, after all. The whole thing came to me in a flash just as those rookies jumped us.

"Something seemed to tell me to try the tractor beam. So Jim and I circled around on the night side of Osarida. We waited there until the planet, turning on its axis, swung Brolt's camp in under us. By that time I judged all his crowd was back across the ridge. So I dropped the Z-2 down over their hangout. At an altitude of about ten miles I started fishing around with the beam. If any furaminite bombs were lying around, I knew I could jolt 'em.

"I used intermittent flashes, intending to let whatever I pulled loose drop back on them. I'd been fishing for ten minutes or so, when the whole lousy planet seemed to blow up under me—"

"Did it destroy that fissure?" asked North quickly. "The one where those plant creatures get water?"

"No—at least, not at this end where the path goes in. They've been going down there all day, a steady stream of 'em, and coming up all swollen out like guys in space-suits. You see, the way I dope it out, that fissure was too narrow and too deep for the explosion to have done any more than choke it up along the surface. Anyway, they're still finding water and getting soaked. . . . Well, that's the yarn. Some stunt, eh? How did I do, chief?"

"O. K.," grinned Alan North, remembering that mental order he had hurled at Manners with the ESP helmet. "I couldn't have planned it any better myself."



### *The Arachne still spins her web!*

Dear Mr. West:

Naturally I had a bit of help on this one from the electrical engineer who showed me the magnet experiment that started me on the truck of the *Arachne*. When Mr. Campbell showed me your letter, your statement about similar magnetic poles and their field struck me as being slightly in error. I've an idea—open to correction, of course—that similar poles repel each other in a way planets don't. The gravity field, it seems to me, is more like the field between unlike magnetic poles, which attract each other. It is a bit different from both, too, probably.

The field between, unlike magnetic poles, does not spread out, but looks—if you could see it—like twine stretched from one hook to another, bulging in the middle, but tightening at the hooks. There are stray lines running everywhere in addition, of course, but they become a heavy rope of "lines" directly in the path between the two poles. If you had a model *Arachne* in there, the rotor might not be strong enough to work on the other edges, but be able to get a good grip on the "lines of force" between the poles.

That solonoid ship on Earth doesn't represent the true state of affairs; the Earth won't run off and leave the ship, even if the solonoid goes dead at the equator. But if it were a space ship which went dead for an hour or two, it might find itself a hundred and fifty thousand miles farther from the Earth and its magnetic field—the latter far too thin now to do much good.

The *Arachne*, en route to Mars from Earth, was stranded when the motion of the pinnetta swept the lines from under the ship. It wasn't in a hole in space, where there were no lines, but the concentration of lines was just too weak to furnish "support."

The theory of relativity, which makes gravity a function of space, to be disturbed only by tearing up the structure of space, is the unified-field theory, I believe. There is more to that theory, and part of it is that magnetic and electric fields are, in like manner, part of the structure of space, to be disturbed only by disturbing the space. So space can be changed around, if you know how.

Magnetic and electric fields penetrate any and all kinds of matter, as do gravitational fields. But the two former can, in a manner of speaking, be led around by the nose.

That's simply because matter, of which we

have so much, is heavily charged electrically and has heavy magnetic effects. But nothing will stop a magnetic field—it slides through anything and everything as easily as—well, as easily as the *Arachne* gets to wherever she starts for!

Write me again when you feel like it, and thanks for your recent letter—Arthur J. Burks, Somerset Hotel, New York, N. Y.

***What about orders of infinity? Cosmic ray particles, for instance, reach Earth from an infinity of directions at any of an infinite number of velocities—which makes an infinitely hard problem for the calculator!***

Dear Mr. Campbell:

I see that Mr. William H. Fell, writing in the October issue, has taken exception to some statements made in a previous letter of mine. Well, now, if I have really disseminated more than my quota of misinformation, as Mr. Fell intimates, I can only ask forgiveness. (No responsibility assumed for flunked exams!) But herewith, a reply of sorts, and perhaps an attempt (as per request) at clarification.

Mr. Fell doesn't appear to care for my statement that minus infinity is plus infinity with the sign changed. To be honest: "So what?" Mr. Fell. Maybe I'm unduly dense, but isn't it? My reference to direction was to the fact that multiplying a quantity by -1 rotates it through two right angles—a change in direction of 180°. The concept of infinity remains unchanged, whether it is employed in either a positive or a negative sense.

The second criticism strikes nearer home. For, alas, I must plead guilty. My definition of the "zero of analysis" was incorrect or, rather, incomplete. Of course, it is not always possible to properly qualify a statement for publication in *Science Discussions* due to necessity of saying much in little space. But no such excuse obtains in the case of the present *lapus*. As a definition, it should have been thoroughly qualified. As a stupid blunder it somehow passed unnoticed by me, wherefore I hasten to correct. The zero of analysis, then, is "a quantity smaller in absolute value than any assignable quantity, however small." Since the reference is to absolute

values, the assigned quantity need not of necessity be positive.

Mr. Pell further states that the "zero of arithmetic" (i. e. "The absence of quantity.") is identical with the zero as defined for analytical purposes. Now in my original letter I carefully refrained from committing myself either way on this point. I simply said the definitions differed. They do. If Mr. Pell can supply the proof of his statement I would greatly appreciate having it. Mathematics, as I see it, more or less tacitly assumes the equivalence of the two zeros, and develops therefrom a highly useful convention—the theory of limits. To my mind, the problem is simply a generalization of those philosophical headaches, Zeno's Problems. A mathematician can "solve" these problems in jig time with the aid of the concept of the limit, but the philosophers, I notice, are still arguing over them.

I admit the concept of "quantities beyond infinity" to be a weird one, but is it any more so than that of infinity itself? Mr. Pell tells us that such an expression "has no meaning at all for a mathematician." That is true, but wouldn't it be better put this way: No mathematician has as yet assigned a meaning to "quantities beyond infinity." You must remember that many of the pet concepts of modern math. were originally meaningless. Thus, the definition of involution gives no meaning to fractional and negative exponents. The sign law of multiplication will not tolerate imaginary quantities. And the arithmetical definition of zero would consign negative numbers to the realm of the "unmentionables." As for the expression "approaches infinity as a limit"; that, too, is "meaningless." "Approaches . . . a limit" implies the existence of a limit which must be a definite quantity. Infinity is not a definite quantity. What is really meant is "increases without limit." Mathematicians have no right to be "reticent about infinity." Indeed, the only thing certain about it is that it permits of an infinite deal of argument.

My statement "Ought not imaginary quantities be considered less than minus infinity?" was, I see, rather too positive. It was intended to be speculative, but unfortunate wording made it assertive. "Could not . . ." would express the thought much better. Obviously, to assign to the imaginaries values which are less than minus infinity would not be logical under our present number system, which accommodates those quantities admirably. But is our number system the only possible one?

Perhaps an illustration will explain what I mean: Let us assume, if we can, the existence of reasoning beings in a one-dimensional world. (No arguments about possibility of said beings, please!) Having no experience on which to base an analogy, such beings could not conceive, even in theory, of a plurality of dimensions. Being intelligent, they could, however, develop a number system which would, of necessity, be linear, or made up only of numbers arranged in order of magnitude along a straight line. Such a system would include positive and negative numbers and a zero. They could conceive of the process of addition, and hence of multiplication, involution, and evolution. From these concepts they could develop logarithms and imaginaries.

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But imaginaries and complex numbers would surely give them pause. They would be unable to extend their number system so as to visualize such quantities as points in a "complex plane." Imaginaries, then, would be destined to remain truly imaginary unless they extended their system in the (to them) only manner conceivable. This would be linearly into the realm of "quantities beyond infinity." In a similar manner, logs of negatives would be disposed of.

Is not the connection obvious? To be sure, there are a number of objections to be overcome, all rather more serious than the "beyond infinity" question, but the problem is by no means insolvable. It should prove a fascinating—if useless—task to anyone with the requisite patience. This is not to say, however, that I advocate the use of such a system. We are not subject to the limitations of our hypothetical "Undimensions." And, incidentally, for an amusing discussion of logic in number systems, I would suggest that Mr. Pell read, or re-read, R. R. Winterbotham's yarn, "The Fourth Dynasty" (Ast. Dec. '38). Withal, mathematics is a wonderful playground for the pragmatist!

Well, I see this letter has already run rather beyond any decent length, but there's one more point I'd like to consider. So please bear with me, Mr. Campbell; I'll try to be brief. It's Mr. Pell's objection to ordering the imaginaries. He doesn't make his point very clear. I cannot understand why one imaginary,  $20i$ , could not be considered larger than another,  $i$ . After all, how are we to compare the magnitudes of quantities save in terms of their absolute magnitudes? Of course, in the case of a positive,  $a$ , and a negative,  $-a$ , we can say that  $-a$  is less than  $a$ , although they both have the same absolute magnitude,  $a$ . But is not this practice simply conventional? A mathematical purist has little use for the expression "less than zero." Is not the coefficient  $-1$  in the expression,  $-a$ , as much an operator as the imaginary unit,  $i$ , in the expression,  $20i$ ? When then, has not  $20i$  a magnitude 20 times that of  $i$ , since the first has an absolute magnitude of 20 and the second a magnitude of 1? Similarly, a complex number,  $c=a+th$ , has an  $a$ . m. of  $c=\sqrt{a^2+b^2}$ . The idea of magnitude is entirely dissociated from that of direction, so any number of complexes might have the same magnitude. Thus  $c$  is also the  $a$ . m. of  $p+iq$  if  $\sqrt{p^2+q^2}=\sqrt{a^2+b^2}$ . Of course, in the extension of complex algebra to vectors in space, the commutative and associative laws must be abandoned and are shelved, but this is entirely apart from the present discussion.—Norman F. Stanley, 43A Broad St., Rockland, Me.

## BRASS TACKS

The definition of Nova calls for an old idea, but done in a new and outstanding manner.

Dear Sir:

Just for the sake of adding my voice to the multitude, I am sending you herewith my ratings for the stories in the December number. They are, without comment (4 star maximum):

- "The Merman".....3½ \*
- "A Matter Of Form".....3 \*
- "The Ephemeræ".....3 \*
- "They Had Rhythm".....2½ \*
- "Helen O'Lo".....2 \*
- "Simultaneous Worlds".....1½ \*
- "Let Cymbals Ring".....1 \*

These ratings are based on a system of my own which covers seven points: nature of story, plot, fundamental basis, accuracy of science, development of scientific argument, style, and total impression. Were it not for the excellence in the authors' style, the last two stories would hardly have been worth mentioning.

However, while the average, or magazine rating for the month is only 2½\*, that of your competitors (I believe the current number is five) is a measly 1½\*, so Astounding still tops the list by a safe margin. There is room for improvement—my hope is for issues which



regularly average at least 3\* by the above system.

Here's a knock. "A Matter Of Form" hardly rates the term "Astounding Nova" as defined in your editorial. The basis of the story is not new, although it certainly isn't hackneyed. No kick about the story, but I think that your new definition has gone for naught.

Here's a hoost. The beer is on the house for that cover by Schneeman. Just the right color proportions and blending. Let's have some more covers by this artist.

And sooooo—with a hope that you will soon use the new paper for the whole magazine, and a compliment on the new heading style, we sign off—John F. Scully, 72 Freeport Ave., Point Lookout, N. Y.

### Williamson coming up—with a sequel to "The Cometeers."

Dear Mr. Campbell:

I was wrong! On the first sight of this December Astounding Science-Fiction, I thought it was just another issue. The cover to me was not science-fiction, and the format of the magazine looked gloomy, but on reading the first story, "A Matter Of Form," my whole outlook was changed.

Your idea of a "Nova" story is very interesting and it seems to have fit the story designated by it. "A Matter Of Form" was an exceptionally fine story—by a new author, too. While on the subject of new authors, I wish you would still print stories by the old favorites. We haven't had many stories from them. Your new author idea is all right, but please don't go too far.

L. Sprague de Camp excelled himself in "The Merman." It was a swell yarn. Hamilton's "The Ephemerae," was original and interesting but not exceptional. I have not yet read "Nuisance Value," which is a promising serial. Of the three stories, "Helen O'Leary," "Let Cymbals Ring" and "They Had Rhythm," the latter was the best. Casey's writing seems to be consistent. For a short science article, Arthur McCann's "Stored Power," was well done, as all of his articles are.

I am in favor of the smooth paper in the magazine. Your new cut on the cover of Astounding isn't better than the previous cut. However, I do like the small cut in the back. Mistake: Hal Vincent and L. Ron Hubbard were not featured in this issue of Astounding Science-Fiction. Brown, Wesso, and Schneeman are best for cover work (in the order of appearance). Wesso is by far your best interior artist.

Let's have some more of Williamson's work—Richard Irwin Meyer, 3156 Cambridge Ave., Chicago, Illinois.

### Well—not exactly conservative.

Dear Sir:

This being Thanksgiving Day, I will say that I am thankful we still have Astounding with us. However, of recent months I have sensed a change in the stories which I somewhat resent: an attempt to over-simplify the stories, and even the science articles. This is all very well, if you are to cater to grammar-school children.

It has gotten to the point where an author has to secure permission from the Brass Tacks critics before he can use a rocket ship, or a ray gun, or any creation of advanced science in his stories. Quite a few of the Brass Tacks boys assume that such things never will come into existence, because our present day science can't create them. This is extremely absurd. Are you considering altering the name of our magazine to "Conservative Stories"? If so, count quite a few of us out as readers.

We don't give a hoot how wild and woolly or improbable the stories are, as long as they contain an element of science, and are interesting,

I am also thoroughly sick of the flood of destructive criticism from a bunch of guys who consider themselves literary critics, and try to regiment the authors' efforts. An author should be free to write as inspiration moves him, without thought of having to conform to the ultra-conservative ideas of chronic squawkers and other guys who are never pleased.

Mr. Editor, give the authors a free rein: that's how our very best science-fiction stories were written. You've lost one of the best men who ever wrote for Astounding Science-Fiction—John Russell Fearn—because of all the squawking a certain bunch of Brass Tacks boys did because he has a real imagination. I am certainly hoping you won't lose your two remaining authors who can really write: Nat Schachner and E. E. Smith. The new authors are fairly good, but they can't begin to compare with the old masters.

Glad to see Hal Vincent again, and wish you could also get Francis Flagg, if he still writes. In the matter of fantasy, you never did have an author who could approach A. Merritt, nor one who could equal A. Hyatt Verrill for exploring stories. Lovecraft's best stories were not published in a science-fiction magazine. A different type of magazine gets the credit for that, also for publishing some space-stories by Robert Howard and Clark Ashton Smith.

The point, however, is that imaginative genius must not be fettered. True science-fiction does not deal with the science of this era, nor must it be confined to such. It's quite common knowledge that today we possess scientific inventions never dreamed of two hundred years ago. Is it unreasonable then, to assume that two thousand years hence, science shall be able to produce inventions which would astound even today's reader of science-fiction?

The mistake that a lot of science-fiction fans are making, is in trying to tie the author's imagination down to present-day science. Because we can't build a spaceship today which would fly to Jupiter, they are assuming that the people of 4000 A.D. will have identical difficulties. This is absolutely ridiculous, as anyone can see after considering the scientific advances which have been made in the past one hundred years alone. It is the ultimate height of folly for anyone to say what shall or shall not be done in the future, beyond mere conjecture. Do any of our bitter protesters think it is an easy matter to write a good science-fiction story? If so, I would suggest that they try it sometime. True creative ability, coupled with literary genius is not a common gift. Originality is not easy to achieve, either, in a field after the stage of initial development is past. It was in the stage of initial development, when authors did not have to consult their readers, that the best science-fiction stories were written. Genius is a solitary gift; it can never be regimented, nor can it become a community affair.

In case the editor is kind enough to publish this letter in Brass Tacks, it is my hope that some of the more persistent demolishers (meaning the severer critics) will give this decidedly important point some serious thought before starting any more major offensives.

Appreciated Nat Schachner's "Simultaneous Worlds" very much. He and Smith are your best authors—C. H. Osborne, P. O. Box 162, Sheldon Springs, Vt.

**Astronomically, a Nova is an old, known star that flares into sudden, enormous brilliance. Schere's story was written six months before we published "Dilmo Deni."**

Dear Mr. Editor:

The December Astounding is what I would call a neat job. Your new makeup of the title seems to have picked up the whole mag-

sine. I would vote for that smooth paper. But watch how the ink takes on it.

Your Nova story, "A Matter Of Form," is well done. Everything rang true, except for the omnipresent black gangsters' cars, which were much too handy and unafraid.

However, I enter my vote against the Nova symbol as used here. A Nova is a brand-new star. This story is old in plot and is really a Variable, or a well-known star which has flared to brilliance. Variable is not such a good label, but Nova is not accurate.

Next on your very neat table of contents is "The Ephemerae." Ephemera is interesting. All these people who are always found so handily after your various catastrophes don't ring true. And suppose Jean had principles. There's no one around to marry them, but Kimball walks out in his tungenst steel—which as far as the author bothers with explanations might as well be molasses taffy—meets a girl and says "Let's be ancestors." My mother didn't bring me up that way. Call this a silly criticism of an all around silly story.

"The Merman" is a good job. De Camp is one of your careful authors who hacks up what he says. He says some pretty wild things but you always believe them. His characters live and breathe—even when they breathe water.

"Helen O'Loy" is well written, but much too farfetched. I can't conceive of a terrifically expensive robot being supplied with all those useless organs which made Helen as good as she was. These fantasies are all right when they are believable, but when they're not they fall flat.

"Let Cymbals Ring!" Let 'em ring at the head of a brass band for this story! When poor, bewildered Herman Doakes said he had nothing more to tell the court, I was ready to condemn Schere for letting us down. Then the story picks up again and at the end knocks you down and adds a delightful kick between the eyes for good measure. This is the rip-roaringest tale you've printed in a long time. Schere, like de Camp, is careful despite all the Astounding things he says, although he did copy his way of telling the story from Ross Rocklynne's "Who Was Dildo Deni?" Could he have done so? But that explanation of the simultaneity theory is damned ingenious. I was looking for another story about that handyman and his scientist friends, but this beats all.

"They Had Rhythm." What kind of a soap and dance is this? The planet is equipped with heavy gravity, which plays no part in the story which might happen anywhere on Earth. More authoritarian (non-political) carelessness. Casey once was good. Now he's coasting and you still priat him.

"Nuisance Value" starts off well. But I am too prejudiced on the subject of downtrodden humaa beings who live outside of domes and the invaders who always have tentacles.

Icicles for "Simultaneous Worlds." I'm tired of Schachner using the same action over and over again.

"Stored Power" is an excellent article. Short and to the point. So was McCana's letter. He knows his technology.

I think that de Camp, Schere and Ross Rocklynne ought to get together. They all have that way of creating human heroes (not like Schachner). Their stories don't depend on a lot of fast fighting. They have a real sense of humor, (not like Casey) and de Camp has more grasp of facts and my guess is that he is an older man than the other two. But I surely would like to see an issue with all three of them.

Hard to rate this one. Call "Let Cymbals Ring!" first by the slightest of margins over "The Merman," because it was so entertaining. "A Matter Of Form" is an extremely close third. All three of these tales really are in the one category. Then "Helen O'Loy," "Nuisance Value," and last and least "Simultaneous Worlds."

More issues like this, please—Albert P. Quill, 502 Church Ave., Brooklyn, N. Y.

## Comment by the year!

Dear Editor:

Would you like to know what I think were the outstanding stories of 1938? You wouldn't? Flae! Here goes:

"Galactic Patrol"—As good as the immortal "Skylark."

"Whispering Satellite"—Wish I had "Basso," "The Degenerates"—BZZZZZZUGGGG GAZZ-ZAWWW FHEEEEEOOOOOOOOO.

"Jason Sows Again"—A good cure for dictators.

"Wings of the Storm"—Wonder what M. W. W. had for supper!

"Three Thousand Years"—I duano.

"The Legion of Time"—Excellent, and very logical.

"Island of the Individualists"—Bring on the next one.

"Static"—Ditto.

"Seeds of the Dusk"—Not had.

"The Secret of the Canal"—Better than most Mars stories.

"Rule 18"—Whoole!!

"Resilient Planet"—No place for a tire manufacturer.

"XI-2-200"—So Ray Cummings at last made a robot without a permanent grouch plus homicidal inclinations.

"Double-Double"—The music goes round and round.

"Grestes Revolts"—Burrpppp!!!

"The Command"—Hot dawg! Maybe it's because I like Mickey Mouse.

"The Sun-World of Soidus"—Ho-hum.

"The Return of the Prowler"—A worthy sequel.

"Simultaneous Worlds"—Maybe.

"Seaward"—Tramp, tramp, the boys are marching.

"Who Was Dildo Deni?"—I'll hite. Who was he?

"A Matter of Form"—Woof! Woof! Well, it WAS good.

Strangely enough, "The Forgiveness of Tenchu Taen" and "Helen O'Loy" seem to stand out above all others. Maybe it's because they seem to be so real and human. The astronomical plates were the best covers, with Dold the best artist. No? Well, I think so! Oh, yes, the science articles were all good—S. S. Sowers, 4115 East Slauson Ave., Maywood, Cal.

## Stars—plums—now planets! But—Gany-mede's a moon and Mercury's a planet, but Ganymede's bigger!

Hiya, Ed:

Excuse the informality, but I am in good spirits, seeing as I have just finished Vic Phillips' Class A story, "Maiden Voyage." Stop! Don't you dare reach for that wastebasket! I have something more to say. I have always liked stories about interplanetary travel, and this one was very well written, with a very good plot. So let's have more stories of this kind.

Here follows my rating of the January issue:

1. "Maiden Voyage"—3 planets (possible 3)
2. "The First Shall Be The Last"—2 planets, 1 moon
3. "Mill of the Gods"—1 planet, 1 moon
4. "Nuisance Value"—1 planet
5. "Blue-Men of Yran"—2 moons
6. "Saurian Valedictory"—1 moon
7. "The Incurrigible"—1 asteroid

Where is that all-famous writer of "Galactic Patrol," E. E. Smith, Ph. D.? Couldn't we have a sequel? Does the Gray Lensman die, or does he have other astounding adventures? I hereby order Dr. Smith to write a sequel to his great story.

Well, I guess I'll have to sign off, or you won't have space for this in Brass Tacks. For your information, I am a worker in a textile plant, and also a would-be author—Bob Fecteau, 10 Autumn St., Waterville, Maine.



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Astounding has become a habit with me. The purchase of this latest proves that, because I went to the city intending to buy an entirely different magazine, and at the same time with the conscious thought that Astounding should be out. The result was a change of mind (it's nice to be able to change one's mind) and then minutes later I was viewing with the usual appreciation the well-known face of this finest of science-fiction magazines.

I do not want all this patter to be thought of as flattery, and at the same time, I personally don't give a hang. It is merely the result of reading a superb issue of Astounding and also the building up of a desire to express certain thoughts in about the only way we followers of Astounding have.

I started to write something a couple of paragraphs back and somehow sidetracked to praising the magazine. I don't regret it. However, Mr. Editor, have you ever been to the point that when you see something there is a slight repulsiveness in its sight? So was I when I saw Astounding this time. As I said, the magazine had become a habit, and it was the habit that prompted me to buy it. But afterward I thought faintly that it would be the same old thing even as I read the readers' departments—things I've been in total silent favor of the past year or more.

But a critical eye led me through the magazine, at first noting the changes which each issue has; and not being very uproariously aroused because of them. And the more I looked at the new illustrations (full page) the more old I like them. Honest, mister, they grew on me, like new-car fashions grow upon one. I can only say in conclusion that as tops, the latest effort to please her critical public raises Astounding higher than the Sun. She's that celestial body's aurora.

But wait! I might say a few words about the stories themselves. I note that a reader has had the bright idea of comparing story rating with "plums." Well, I therefore say that "Maiden Voyage," by Vic Phillips, deserves a whole lot of 'em. It's positively the nearest thing to humanism I've come across in Astounding in quite some while. I might say here that I, as I suspect most readers have, want to write, and I've no better example to go by than the way Phillips wrote "Maiden Voyage." Truly the "Voyage" occupied an appropriate place in the middle of the magazine, for it is definitely the meat of the sandwich.

Wellman's "Nuisance Value" concluded effectively and most caustically. Darragh was just that—a sneaking, unfair inspiration-elad "mosquito." Truly, he was a nuisance! I was even feeling slightly sorry for the Cold People at the last because I have realization enough to know that if we, Humans, attempted the subjugation of some world as they did, there would have been slight mercy shown any of the native inhabitants. When the United States built her canal she chased its dangerous inhabitants from the territory. They were dangerous, and as dangerous foes they were dealt with. The only difference is, the Cold People had the unfortunate luck of having as foes mosquitoes with brains.

The rest—well, as far as entertainment goes, they are O. K. And that, I believe, is what most of us buy Astounding for. I found Johnny Black as bright as ever. The solving of a problem—"The First Shall Be Last" quite interesting and very logical.

So, nil in all. Mr. Campbell, you can go out on Seventh Avenue and shout to the rest that a good start is not necessarily a bad ending—and believe me, if the rest comes up to this you'll have no complaints—not from me—J. C. Fine, Kelly Field, Texas.

## Maybe they, like lobsters, had haemocyanin blood?

Dear Editor:

What was the matter with them poor blue men? Did they have acute cyanosis? Was it very cold in Yrano? Didn't they have oil burners?

Maybe they were science-fiction fans that took it too seriously—Hewitt D. Hackmann, Red Bank, N. J.

# Believe It or Not! by Ripley

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